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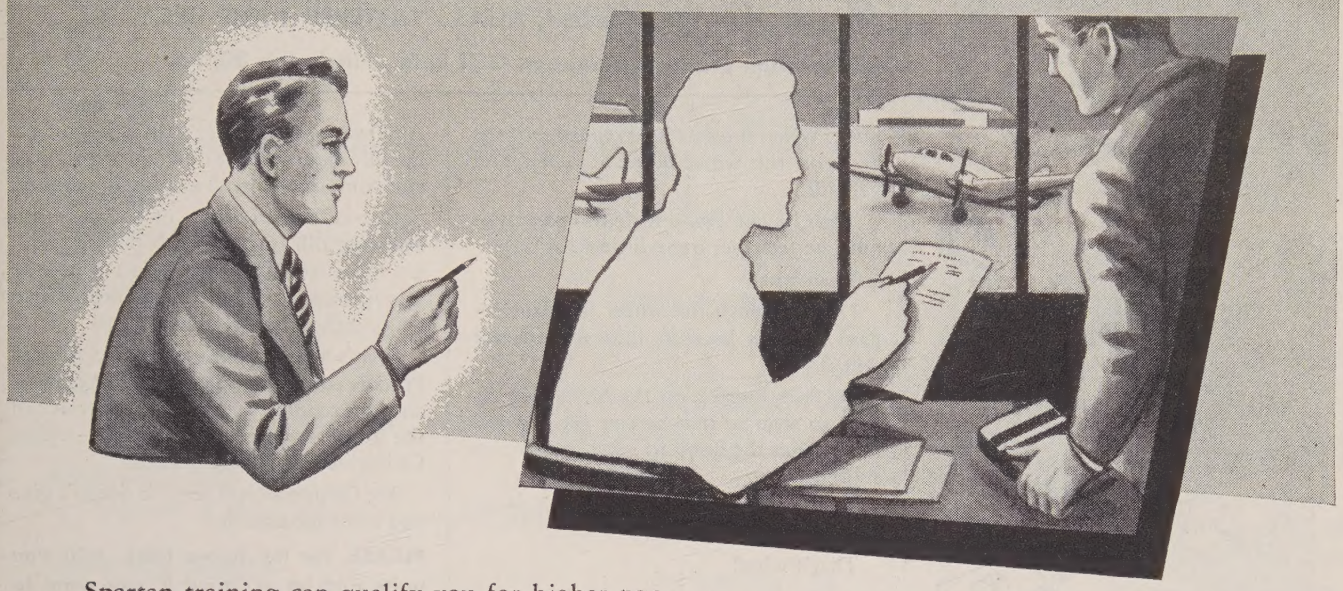

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The Birdmen's Perch

By *Major Al Williams*, ALIAS, "TATTERED WING TIPS,"
Gulf Aviation Products Manager, Gulf Bldg., Pittsburgh 30, Pa.

Hey, wait a minute!

We think we see a dangerous situation arising.

We're referring to roadable airplanes, of course. There are a couple of them just about ready for the market and frankly, we're worried.

Suppose a guy has been driving a car for 10 years and when he's on the road, he does almost everything automatically . . . you know, reflexes.

And suppose this same lad has been flying for the same length of time, and does most of his air work automatically, too.

Okay . . . so he gets into his roadable plane, lines up with the runway, and starts down the strip, buckety buckety buck. When she gets up to speed, he tugs back on the wheel (airplane reflex) and gets off.

Then he climbs—a little too steeply—until he feels her fret a little . . .

Then what?

Does he push the wheel (airplane reflex) or does he shift into second (car reflex)?

Or does he step on the brake (car reflex) to stop so that he can get out and look under the hood to see why she's so sluggish?

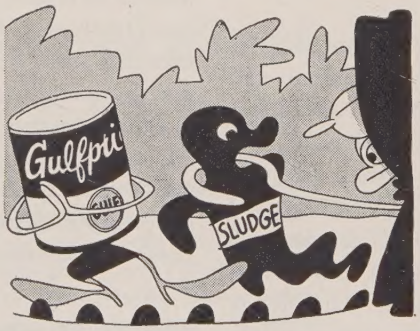
Somebody better investigate this problem before it's too late!

That's what!

HIDDEN DETAILS

From where we're writing, this month, we can look out a window and see an old building being torn down.

This building was a hotel which we've been in many times in the past. But we had no idea of the curious and fascinating inner details of such a structure until we saw floor after floor being stripped from this one.



Naturally we were reminded of Gulfpride Oil. (*Everything* reminds us of Gulfpride!)

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PLEASE, fer the luvva Mike, will you write and let us know if you want to continue the "Little Known Facts Department" or substitute something like "Favorite Flying Gripes?"

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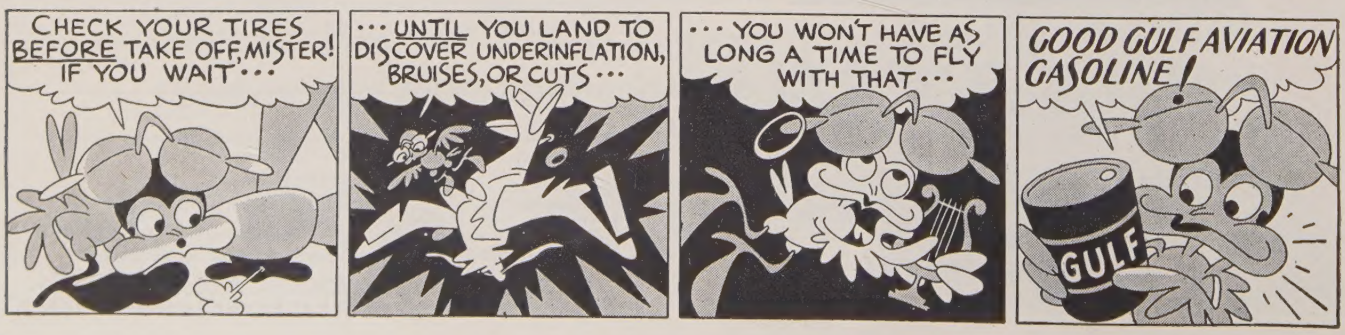
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SKYWAYS

Incorporating Air News

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There are two SKYWAYS: English and Spanish

APRIL 1948

VOLUME 7, NUMBER 4

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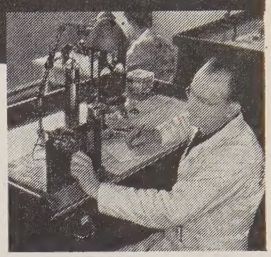

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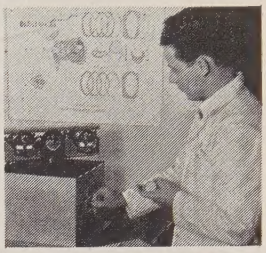
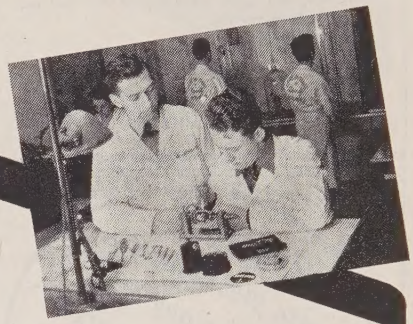


Instruments depend on TRAINED TECHNICIANS to service and maintain them



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AIR YOUR VIEWS

Success Notes

Gentlemen:

You ran a short piece about Stewart Field at Parkerburg, W. Va., in the January issue. I believe you omitted one very important "boast."

When my brother and I stopped at that field for the first time last summer, we were welcomed to the airport by Mr. Stewart. He took great pride in telling us of future plans for his field and was very helpful in securing weather information for us and in helping us plan the final leg of our trip. Stewart Field possesses that one trait so often lacked at airports—courtesy.

H. J. SCHULTHEIS

Baltimore, Md.

Congratulations to the able Mr. Stewart and thanks to you for adding to our "coverage." We'll make a stop at Stewart Field a "must" on our schedule.—ED.

•

Gentlemen:

There are two articles in the January issue that I sure liked: the one on Dr. Brewster was of great interest, and I liked the one called "Headline Cargo."

When I was a small boy I was on hand to greet Dr. Brewster and his plane on the first trip he made to our town, McCook, Nebraska. I remember so well watching his plane and being the first one to see him coming in.

In connection with the other story, "Headline Cargo," I believe the first flying newspaper plane was a Curtiss *Robin* owned and operated by the McCook Daily Gazette back in 1929 or 1930.

L. N. LYON

Burbank, Calif.

•

Gentlemen:

My copy of January is going on file for keeps . . . thanks to our article, "Flying Doctor." I have known and watched Dr. Brewster since he hung out his first shingle. To appreciate what he has given private flying, one must know that he has been a "first" in promoting advancement in private transportation since the beginning of the motor age, and has outlived the agonies and discouragements that came with each. The proving of his conviction in regard to flying and its place and value to man has taken patience, money and years. My first ride, in one of his *Orioles*, was the birthplace of my determination to some day own and fly a plane.

H. R. HEWETT

Hewett Airport, Beaver City, Neb.

SKYWAYS is happy to be on the long list of admirers of Dr. Frank Brewster . . . and we're grateful, too, for his friends who, by writing us, express their activé admiration for a man who is indeed a true friend of all aviation.—ED.

•

Canadian Charts

Gentlemen:

In a recent "Air Your Views" column, there was a request for an airport listing for Canada. I hope the following information will be helpful: The Canada Airpilot (in two volumes) contains 440 pages of airport information. Vol. 1 includes data on Western Region—Pacific Coast to Winnipeg; Vol. 2 covers Eastern Region—Winnipeg to Newfoundland. All pilot information is included: radio aids, airways, weather report info., etc. Requests for this book (or books) should be sent to Surveyor General, Dept. of Mines and Resources, Habelle Bldg., Ottawa, Canada. Each volume costs $5 . . . and is worth it.

J. C. ROSS

Nova Scotia

Thank you, Mr. Ross, for that information. We've had many requests from readers regarding it and are happy now to be able to pass the good word along.—ED.

•

Flight By Sight

Gentlemen:

As a private pilot with about 35,000 miles X-C over 32 states in all kinds of weather, I feel qualified to state that I agree 100 per cent with Mr. Thompson's article, "Flight by Sight."

And here's one for the book: I took off from Stroudsburg, Pa., on a calm day with good visibility, and headed for Teterboro Air Terminal, 60 airline miles away. Three other pilots (girls) took off at the same time and with the same destination. Each of us was flying a 65-hp *Cub*.

After being in the air one hour, I landed at Teterboro, but the others weren't anywhere in sight. Thirty minutes later, one of the pilots came in and reported that when she saw the Hudson River she realized she'd gone too far! But the other two pilots didn't show up until two hours later. After crossing the Hudson River, New York City and numerous Long Island airports, they ran low on gas and so stopped at MacArthur Field, 50 miles East and beyond their destination. They didn't know where they were until they pulled up to the gas pit and asked!

This happened just because all these pilots saw was their compass heading.

A. YODER

Reedsville, Pa.

Amen!—ED.

•

Flying Club

Gentlemen:

A small group of fellows here in Texas are trying to buy a plane and we've run into difficulties trying to arrive at a good plan. We'd like to form a club and would appreciate any information regarding rules, responsibilities, etc.

L. E. KELGARD

Jefferson, Texas

Might we suggest you write to Aero Insurance Underwriters, 111 John Street, New York 7, N. Y., and ask for a copy of "Flying Clubs." This is an extremely helpful booklet.—ED.

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Hydraulic Shock Absorbers	√	√
Navigation Lights	√	√
Variable Pitch Propeller	√	√
Self Starter and Generator	√	√

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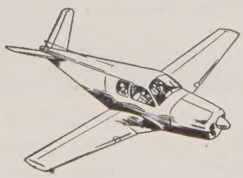

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MILITARY AVIATION

TWO years ago last January the Military Staff Committee of the United Nations met for the first time to draft the articles by which the world's military police force would be established and governed. The committee was composed of the chiefs of staff of the Big Five, or their carefully selected representatives. These men sat down and wrote a paper 10 chapters and 41 articles long. But when they were through—15 months after their first meeting—there was still no police force. Nor is there yet. Fourteen of the 41 articles had to be referred to "higher headquarters," in this case the Security Council, to be resolved because the members of the military staff could reach no agreement whatsoever. Of the remaining 27, many were so watered by the compromise of ill-will and suspicion as to make them useless as a military plan.

Since April 30, 1947, the report of the committee has been in the hands of the Security Council which has, to this very date, failed to resolve the disagreement of even the first of the disputed points.

In the matter of air power, the United States delegation originally recommended the establishment of a force of 3,800 planes. France recommended 1,275 and Russia, England and China each proposed 1,200. In consideration of the fact that the United States alone found it necessary to build an air force of 80,000 planes in the last war, such recommendations seem absurd if we are endeavoring in truth to build a police force capable of fulfilling the full obligations imposed by the UN charter.

But now it has been learned unofficially that the United States, in a desperate effort to arrive at any compromise, has offered to cut a thousand planes from its recommendation of 3,800. Even this, however, has not as yet been accepted.

SHORT SIGHTED

In very few instances did the President's Air Policy Commission arrive at conclusions in its historic report which were in contradiction to the recommendation and advice of our senior air officers. The five-man panel headed by Thomas K. Finletter did take exception, however, to the apparently short-sighted military practice of denying to civilian contract agencies a reasonable amount of overhaul and maintenance work. During the war such companies as Pacific Airmotive, Aviation Maintenance Corp., and Southwest Airmotive were of uncalculated value in keeping our military aircraft operational. In the event of another war it is reasonable to forecast that these concerns again would be called into service almost as quickly as the manufacturing industry itself. Yet while the military establishment has wisely adopted a paternal interest in the manufacturing end of aviation and has extended contracts to the full limit of its budgetary allotments, it has unaccountably ignored the maintenance and overhaul industry. If it is true that Boeing and Douglas cannot exist on civil contracts alone, it is almost equally as true of Pacific and Southwest. Furthermore, even if maintenance agencies were financially independent of the military, they would be of little assistance in another emergency unless they were acquainted with the technical advances in military aviation. Deplorably enough, the president of the largest overhaul company in the United States recently admitted that there wasn't a mechanic in any of his shops who *had ever had his hands on a jet engine!*

It was in consideration of these facts that the Finletter committee reported to the President that "Testimony before us has indicated the economy and other advantages of having modification and overhaul of military aircraft done by . . . civilian organizations under contract. The services are not in agreement and stress the need for training their own overhaul personnel in their own shops. We recognize the validity of the argument but recommend that the services weigh carefully the savings possible through contract overhaul, and the possible long-term advantages of building up civilian staffs trained in such work for use in an emergency."

In the interest of a well-rounded air-defense program, it is certainly to be hoped that the military establishment will recognize the validity of the commission's report and take immediate action accordingly.

FAST-JUMPING PANTHER

In 1922 the General Board of the Navy reported to President Coolidge that "Of the weapons of today, the gun, the air bomb, the torpedo and the mine, the gun is considered by far the most important." But by last fall the Navy had come to another conclusion. In the words of one of its most famous battleship admirals, "The Navy doesn't exist now for support of the 16-inch guns of battleships, but to support aviation. We all realize that the rest of us are in effect backing up Navy air."

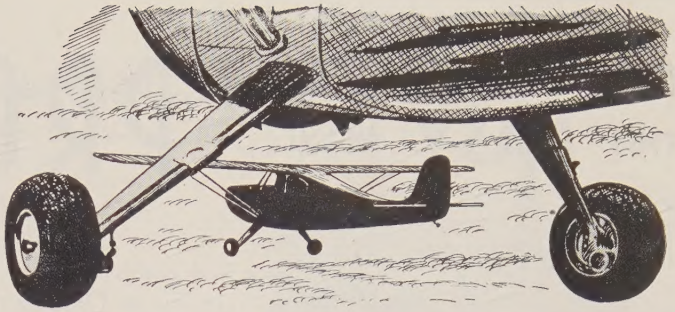
That the admirals are serious in this radical, new philosophy was given good evidence recently with the introduction of the new Grumman *Panther*, a carrier-based jet fighter with more power than a B-17, *Flying Fortress*, or a B-24, *Liberator*.

The *Panther* was designed to attain a top speed of well over 600 mph but, more important than that, it was designed to prove that jets could be operated successfully from our present day flat-tops without the huge ships having to be subjected to major modification.

One of the devices employed by the *Panther* for this purpose is the "droop-snoot" leading edge of the wing which gives the plane a high-lift profile for take-off and landing. Another is the undercut tailpipe which allows maximum take-off thrust without the "smothering" that occurs when tailpipes are extended. The prototype *Panther* is powered by a British-built Rolls Royce *Nene* engine. Production models, however, will be equipped with Pratt & Whitney-built jet engines.

But while the *Panther* is unquestionably one of the finest postwar planes to be developed by either the Air Force or the Navy, it must be kept in mind that the plane still has only a 300-mile radius of action and that its usefulness is, therefore, limited to a great extent to action against another maritime power.—C. E. R.

Standard of California's PLANE FAX



A page of service tips for private flyers and fixed-base operators

High oil consumption indicates cylinder wear

The most difficult place to lubricate in aircraft engines is the upper ring travel. That's because ordinary oils "run away" from these hot spots, expose them to excessive wear. You can judge the amount of wear in this area of your engine by its rate of oil consumption, for increasing consumption indicates worn rings. RPM Aviation Oil is compounded to stick to the hottest parts of engines, reduce ring and cylinder wear.

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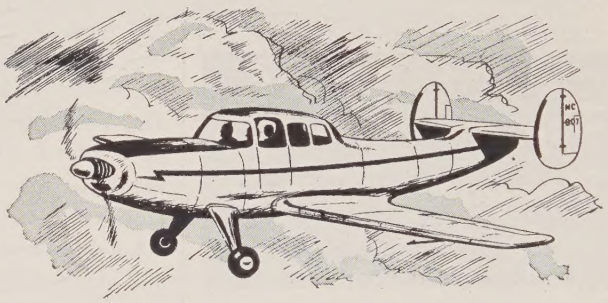

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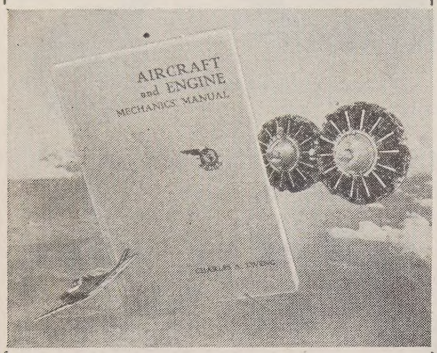

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SKYWAYS

May Issue

PROP WASH

Aero Oddities

Red Light. When engine of a trainer cut out at 1,000 feet over Van Nuys, California, pilot set his ship down in middle of wide boulevard. Ship bounced once, rolled half a block, then came to complete stop at busy intersection just as traffic light turned red. (*J. Dolin, N. Hollywood, Calif.*)

Practice Jump. After demonstrating snap roll in Waco UPF7, the instructor motioned for student to take over. Getting no response, instructor turned around and found student missing. He went back to airport, organized group to look for missing student. Group found him walking out of a hop yard, chute in hand and farmer in tow demanding to know why he had to practice landing in his yard. (*C. P. Rebman, Buena, Wash.*)

The Way Home. An elderly lady student pilot took off from Dale Mabry Field for a local hop. When she decided it was time to come in, she headed for what she thought was home, and landed at another airport, 35 miles NE from her own. Taking off again, she wound up this time at a field 40 miles NW from home base. After third failure, she long-distanced home airport, got an instructor to come out and fly her home. (*L. C. Love, Tallahassee, Florida*)

Bush Pilot. Having flown nothing but simplified-control planes, Pilot Van Tassel decided to take some time in regular three-control. After practicing all day on a three-control using wheel, he finally got over trying to use wheel to steer while taxiing and to remember to use rudder. Going home that evening in car, he came barreling along the road to a sharp left turn. As Van Tassel reached it, he hit the clutch with his left foot, tried to haul back on the stick . . . and shot across the road, over the curb and into a clump of bushes. (*K. Van Tassel, Upper Montclair, N. J.*)

Blind Flying. On a long cross-country recently, the steady hum of the *Voyager's* engine and the bright sun made pilot sleepy. Knowing companion was on the controls, he took a nap. Some time later pilot awoke with a start and discovered friend also asleep and snoring. He got onto the controls, woke "copilot" and both busily began checking position. They were 30 miles from last check point, directly on course at their cruising altitude! (*E. G. Vetter, Rochester, N. Y.*)

Jump Ship. Pilot W. Seig ran into a snow storm on a X-C near Fargo, N. Dak. Plane being equipped with skis, pilot landed at next airport alongside N/S runway, started taxiing to apron. Nearing bare concrete runway, pilot gunned engine, jumped ship over concrete strip and continued taxiing on snow-covered ground. (*C. J. Gronewold, Lewisville, Minnesota*)

Old Friend. Operator Larson bought an old St. Louis *Cardinal* built back in 1929. Wanting information on ship, Larson looked up aviation clippings he'd saved since he was a kid. Found a picture and all details of the very same one he'd just bought. (*M. D. Larson, Concord, Calif.*)

Air Express. Grocer Rex Foreman received last minute order for several turkeys. Having no phone service and with roads bad, Foreman chartered plane, made trip to grower in 30 minutes. Turkeys were delivered in time. (*A. Miller, Bowman, North Dakota.*)

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box, 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

Scientist, merchant, artist...

all fly for profit

Cecil Hagen, Houston consulting geologist, flew his 4-place Bonanza 20 hours his first week of ownership. Covered "3,000 miles, which would have taken 3 times as long by other means of travel." The whole U. S. is now his operating territory. He personally watches various operations without hiring more men as in the past.

Bonanza-owner H. C. Bowers, retail furniture dealer of Salt Lake City, can now make all those buying trips he *should* have been making . . . and didn't. Has more time at the store, too. Increases out-of-town sales by flying customers to the home store. Bonanza travel pays . . . in *many* ways!

Opera star Mona Paulee makes a 40,000-mile concert tour—on schedule—with the greatest of ease. "Only way to maintain that strenuous schedule is with our Bonanza," she says. Dean Holt, her husband-accompanist, does the flying. "Gives us time to hunt, fish and meet people."

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A.A.F. Gen. SPAATZ says: ". . . can be read with profit by the engineer, the pilot and the layman."

Aeronautical Engineering Review says: "Data previously scattered have been gathered in this book, presenting a useful summary of the subject, . . . should continue to be useful. . . ."

Here are some of the vital 21 chapters: JET PROPULSION; THRUST & PERFORMANCE; GAS TURBINE COMPONENTS; COMBUSTION SYSTEMS; METALLURY; BRITISH GAS TURBINES; AMERICAN GAS TURBINES; GERMAN GAS TURBINES; TYPES OF TURBINE-PROPELLED AIRCRAFT; JET VERSUS AIRSCREWS; AERO-DYNAMIC PROBLEMS; STEAM TURBINES; GUIDED MISSILES AND FLYING BOMBS; ADOPTION OF JET AIRCRAFT, etc. etc.

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Value for Your Defense Dollar

AN EDITORIAL

THE national budget is like the family budget—we've got just so many dollars to cover everything that's needed and Congress today is in the worrisome position of a father with a lot of children, all wanting new shoes at the same time. It's principally a case of deciding who has to do the most walking or who has the biggest holes in the soles.

SKYWAYS has sometimes belabored Congress for failing to see and act upon urgent defense measures, and certainly reserves the right of a free press to do so again when situations arise which call for straight talk. But the present Congress, for all its political preoccupations, is a badly worried group of men. A great many of them had the first opportunity of their lives last summer to see for themselves the bitter frustrations and desperate need of peoples in other parts of the world. Many of the Representatives flew across an ocean for the first time in their lives and were suddenly brought face to face with the hard fact that 3,000 miles of water is no longer a comfortable barrier of either time or distance to a determined enemy. They discovered that breakfast in New York and dinner in London could mean the difference not only of a few hours on the clock but of the distance between plenty and want, tied very tightly together by an invisible line through the air, a line anybody could use.

They had the additional experience of seeing for themselves—in the local papers of countries they visited—the vicious and distorted ideas about the United States that are being fed those countries by the Communists. They were angry men as well as wiser men when they returned. It is no longer necessary to "sell" them the importance of air power. They have seen the broken cities and the broken lives of World War II, and they know at last that Washington and New York, Chicago and Detroit will be the Pearl Harbors of World War III—on the first day of unannounced attack. They know that the President's Air Policy Commission was allowing itself to be extremely optimistic in setting December 31, 1952, as the potential A-Day of that Third War.

They will continue to play politics, because quite humanly they want to be reelected—and they will continue to need reminding that the clock will not wait for their fence-building. They will continue to exhibit sharp differences of opinion about methods of doing what has to be done, but they no longer disagree as to its urgency.

The President's Air Policy Commission made an extraordinarily fine and significant statement when it said: "Our national security must be redefined in relation to the facts of modern war.—[That security] can be assured only by the elimination of war itself.—[The United States] must work to achieve world peace—[but]—not being able to count on the creation, within the future for which it now has to prepare, of a world settlement which would give it absolute security under law, it must seek relative security under the protection of its own arms.—Nothing would be more likely to provoke aggression than the spectacle of an unarmed United States."

Thus, like the father of the family, the Congress and the people must decide what priorities to assign to the multitudinous claimants on the public purse. In the face of inflationary costs, the tax dollar will buy less and less than in other years. Those rising costs affect the aid we will send to Europe under the Marshall Plan. They affect the prices of food and airplanes equally. Both are implements for the prevention of war. How much can we afford to spend for each of these weapons?

The figures seem astronomical. We are asked to gamble billions on the hope that we can help Europe rebuild itself and so prevent the spread of Communism. We are obligated to fixed expenditures of more billions for the care of our occupation armies, our veterans, our national government structure and the maintenance of our domestic economy. Beyond this, we must accept the hard fact that the minimum expenditure for the military budget will probably rise to some $13,000,000,000 in the calendar year 1949, after having spent roughly 10 billions in 1947 and 11 and a half billions in 1948. Even then, we will not be sure we have spent enough.

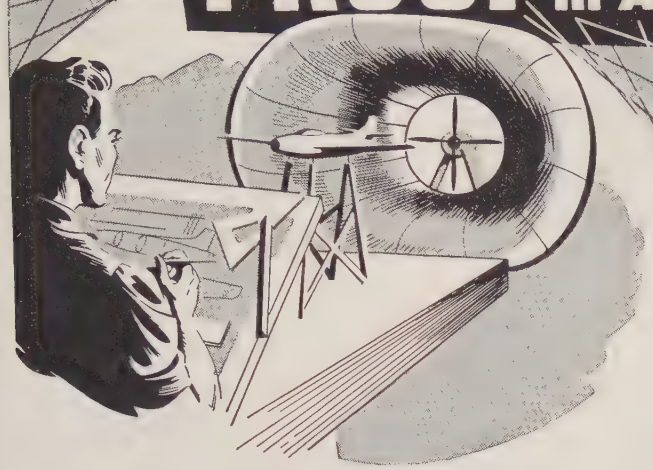
It is a frightening prospect—but there are other things that are much more frightening. We shall have to accept priorities, even as we accepted rationing in the days when the Axis was threatening our security. Congress will have to make many unpleasant choices—some of which may well mean the end of certain luxury-type industries. We shall all have to dig deep to pay the bills. We shall have to think clearly and steadily about those things which are essential, which are fundamental to our way of life.

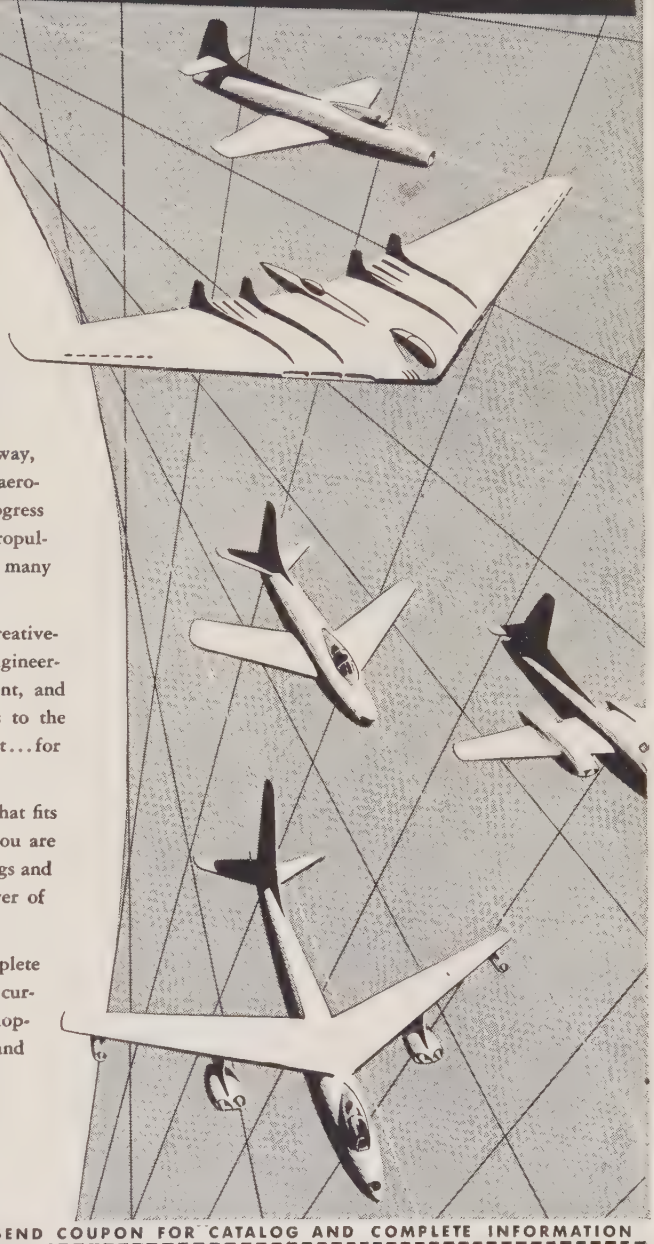
We have been accused many times of being dollar conscious, but we are a people who have had to work for our dollars and who have learned to value them for what they will buy. We give them gladly when we know that the product is worth the price—and that includes feeding a hungry neighbor. We have never failed to face up to a legitimate demand, when we have been able to see that it was legitimate. One of the principal responsibilities resting on the Congress and the President now is to make the people realize why they are being asked to spend so many of their hard-earned dollars.

We must be told in simple and understandable terms that what we are buying is time in which to build the peace we all want: that we are buying the right to continue living as free men under a government of our own choosing, and security against destruction of our civilization with its laboriously acquired values in human dignity. That airpower—if we have the best—can be truly peace power, but that no second best will do.

We have never faced a more dangerous nor a more momentous choice. It is no exaggeration to say that tomorrow hangs in the balance. This time it is "billions for defense, but not one cent for tribute."—J. FRED HENRY

PROOF of MORE OPPORTUNITY for you than ever before in Aeronautical Engineering





Right now there are more aeronautical engineering projects under way, and scheduled for the future, than ever before. Opportunities for the aeronautical engineer grow greater, grow broader, day by day. Spectacular progress in aviation is being ushered in by Flying Wing design, jet and rocket propulsion, gas-turbine engines, sonic and super-sonic speeds, atomic power, and many other still-secret developments.

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HANGAR FLYING

Personal Aircraft Production

FIGURES recently given out on personal plane production during 1947 show that a total of 16,023 airplanes were built for private owners. Although this output is less than that of '46, it is two and a half times greater than the number built in 1941, considered a peak prewar year.

Lycoming Test

THE TWO LIGHTPLANE PILOTS who flew around the world in their two Pipers last year chalked up an enviable report for the Lycoming engine. Cliff Evans and George Truman reported "no engine trouble in 25,000 miles . . . and it used even less gas and oil at the end of the trip than it did at the beginning." Not only did the engine give them no trouble at all but the boys didn't have to change a single spark plug. Both Lycoming and BG are entitled to congratulations, along with those for Evans, Truman and Piper Aircraft, of course.

Quick License

EVERYTHING happens quickly these days and Dick M. Koons recent accomplishment was no different. Employed by an oil company in Venezuela, Mr. Koons was on terminal leave and so returned to this country. He arrived in Florida on the 22nd of the month; was at Erco Field, Maryland, on the 23rd; began his flying lessons on the 24th, soloed on the 26th, and with 9½ hours of dual instruction and 20 hours of solo time under his belt, he received his pilot's license on the 4th of the following month. Mr. Koons purchased an *Ercoupe* and after a few days at his home in Norman, Oklahoma, he is flying it back to Venezuela where he will use the ship in connection with his work there.

Safe Flight Indicator

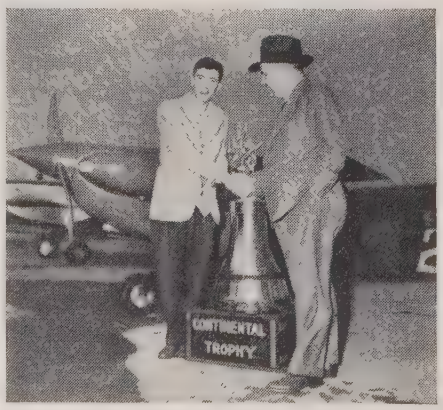
PROSPECTIVE plane purchasers will be interested in the news that from now on all Stinson *Voyagers* and *Flying Station Wagons* will be delivered equipped with the Safe Flight stall warning indicator. Making this standard equipment on the Stinsons is another forward step in the direction of increased safety in private plane operation. While Stinson leads the field in making the valuable Safe Flight Indicator standard equipment, other plane manufacturers probably will be required, by purchaser demand, to either make the stall warning device standard or most certainly optional, as in the case of the 85-hp *Silvaire Deluxe* by Luscombe.

Continental Trophy

WELL-KNOWN youthful racer Bill Brennand of Oshkosh, Wisconsin, won the 3-foot 4-inch silver trophy presented by Continental Motors Corporation at the All American Air Maneuvers at Miami, Florida. Piloting a *Whittman Special* in the Continental Trophy Race, Brennand flew at an average speed of 166.473 mph to win first place and a miniature replica of the original trophy. Second place went to H. R. Salmon who averaged 158.532 mph for the course. "Fish" Salmon's tiny racer was one entered by Le Vier & Associates.

The Continental Race, an annual event, is limited to planes powered by engines not exceeding 190 cu. in. piston displacement.

(*Continued on page* 64)



RACE WINNER Bill Brennand of Oshkosh, Wis., gets congrats from Continental's Reese

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Here's the plane you said you wanted

A prominent spokesman for America's flying farmers recently listed nine outstanding qualities necessary to get maximum utility from a plane bought for farm use. Reviewing those features, one might almost conclude that he was describing the 1948 *Ryan Navion.* No personal plane on the market today offers a *better combination* of all those qualities.

1 YOU WANT A PLANE BUILT TO WITHSTAND RUGGED USE

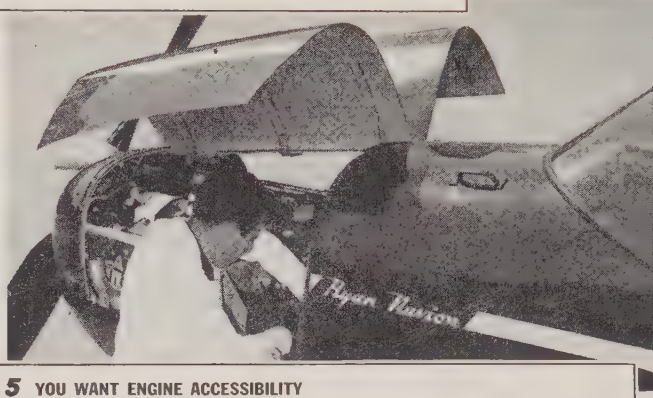
2 YOU WANT LARGER WHEELS AND BALLOON TIRES

All-metal, thick-skinned, the *Ryan Navion* is as tough a plane as you can buy. *Navion's* power-retractable tricycle landing gear with steerable nosewheel...the wide wheel tread...the big oversize tires...plus hydraulic flaps and shock absorbers...put you down smooth and solid—even in cross winds, on soft or rough fields.

3 YOU ASKED FOR REMOVABLE SEATS TO PROVIDE CARGO SPACE

4 YOU ASKED FOR QUICKLY REMOVABLE WINDSHIELDS

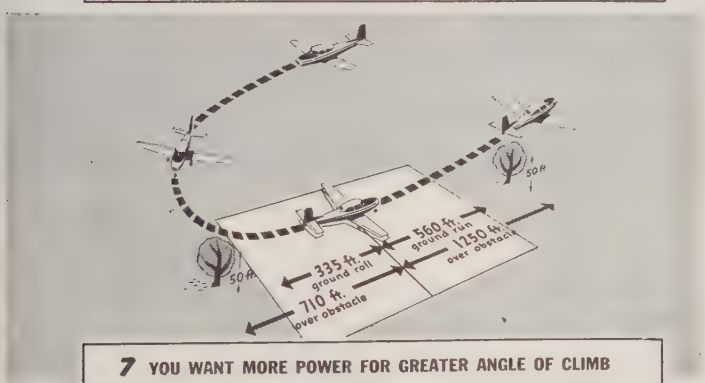
With three seats removed, the *Navion* will fly 645 lbs. of bulky cargo in 55 cu. ft....plus pilot and sufficient fuel for nonstop trips of 500 miles. With just two seats out, you can carry 455 lbs. of cargo. Canopy is temporarily removable for quick and easy loading. *Navion* gives multi-purpose utility...at an operating cost which compares with your truck's.



5 YOU WANT ENGINE ACCESSIBILITY

6 YOU WANT STARTERS

Could anything be easier to get to than the *Navion's* engine? No tubular structure to get in your way...plenty of room to work ...and you lift the hinged hood exactly as you would your car's. A reliable electric starter is included in *Navion's* standard equipment, as well as generator, 2-way radio, position and landing lights, and navigation instruments.



7 YOU WANT MORE POWER FOR GREATER ANGLE OF CLIMB

Navion's rate of climb is 830 ft. per minute; a 185 hp engine and variable-pitch propeller get you up safe and fast even with maximum loads. Here's the 4-place, 150 mph plane with the wing and aileron design that gives control even below stalling speed...with 54 mph landing speed. *Navion's* performance is superb on improvised air-strips and high altitude fields. It's the plane that's easy to fly SAFELY!

8 DOORS THAT STAY LOCKED, WINDOWS WITH LESS RATTLE

9 SEAT CUSHIONS WITH MORE CUSHION

Navion's windows *can't* rattle; they're sealed in rubber. The air, rain, and wind-sealed canopy gives 360° visibility...and there's a *pick-proof* cabin latch and lock. Posture conforming seats cushioned with deep airfoam rubber...arm rests...and plenty of head, leg and elbow room give you the comfort you're asking for. Perfected sound insulation...improved draft-free ventilation...ash trays, glove compartment, cigarette lighter...beautiful all-wool upholstery...make the 1948 *Navion* cabin a "flying living-room."

THAT'S WHAT YOU ASKED FOR...BUT *NAVION* GIVES YOU MORE!

Speed without sacrificing safety...power and ruggedness yet with the lightness that means low operating cost...unmatched three-way stability even in rough air...ease of control that makes even beginners say "You just drive!"...all these are *Navion* qualities on the plus side. Prove it to *yourself.* Write today for a fully illustrated brochure and a demonstration by your nearest dealer.

NEW *Navion* By RYAN

Rely on Ryan RYAN AERONAUTICAL COMPANY, 204 Lindbergh Field, San Diego, California

Navajo NAVION

By RUTH and DON DOWNIE

Pilot Barry Goldwater flies authors into remote Navajo country to show airplanes' part in aiding the Indians

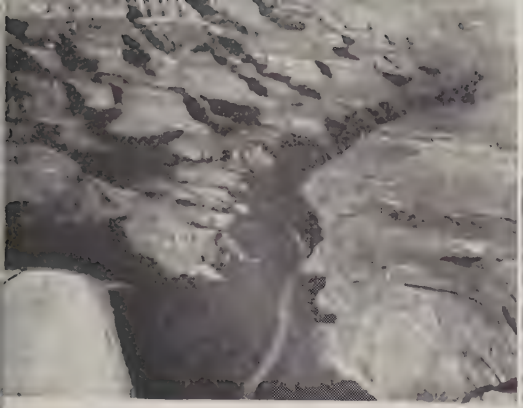
NAVION, owned and flown by Barry Goldwater, lands at Monument Valley Airport *(above)* to gas up. Cliffs in the background make this field a one-way operation. Indians at Monument Valley *(below)* live in paper shacks, wood huts

"THROW away your maps and turn off your radio when you fly over this country."

Barry Goldwater, lounging at the controls of his *Navion,* looked out over a snow-covered plateau of Arizona as Phoenix disappeared into the sunrise behind us.

"Out in this country you fly by San Francisco peak. See it up there ahead on the horizon? That mountain is 12,794 feet high, and it is easy to see from any point in the Navajo country."

Destination on this flight was Rainbow Lodge, deep in the 16-million acre Navajo reservation, 100 miles up-stream from the Grand Canyon. Bigger than the state of Illinois, the reservation has been prominent in the news during recent months when magazines and newspapers brought the plight of



GRAND CANYON is rugged country to fly over to get to the 16-million acre Navajo reservation. There are 14 landing fields there, only four show on maps

FLIGHT STRIP at Rainbow Lodge has elevation of 6,200 feet, and is 2,000 feet long. You have to land uphill and take-off downhill regardless of wind

MARBLE CANYON AIRPORT is a 4,000-foot strip *(center and left of highway, above)* located at an elevation of 4,000 feet. A DC-3 could land in emergency. Plans are under way for construction of 17 7,000-foot strips in Navajo area

the near-starving Indians to the attention of the country. In this flight, made exclusively for *SKY WAYS*, Mr. Goldwater demonstrated the part being played today by aircraft in aiding the unfortunate Navajos.

"This country is the greatest spot in the world for the private pilot," said our guide as we flew over Bloody-Basin and picturesque Oak Creek, second only to the Grand Canyon in its brightly colored rock formations. "There are 14 landing fields on the reservation, but only four of them are on the map. Our field at Rainbow lodge is only 2,000 feet long and the elevation is 6,200 feet. That's far below CAA requirements, but I've shot over 100 landings there in the past two years without difficulty.

"Up in this country we use the airplane for every-

thing. It is nearly 6 hours' fast driving from the Lodge to Flagstaff, Arizona. That's our nearest town and we do all our shopping there. Last week I flew Katherine Wilson, wife of the Indian Trader, into Flagstaff on a shopping trip. Our flight time was 45 minutes each way, and we had over 300 pounds of groceries delivered to the lodge in time for lunch. There's no telephone, of course."

Our *Navion* circled west of Mt. San Francisco and headed toward the Grand Canyon.

"It's a little farther this way," Goldwater said, "but if you've never flown over the canyon, it'll take us only about 20 minutes longer."

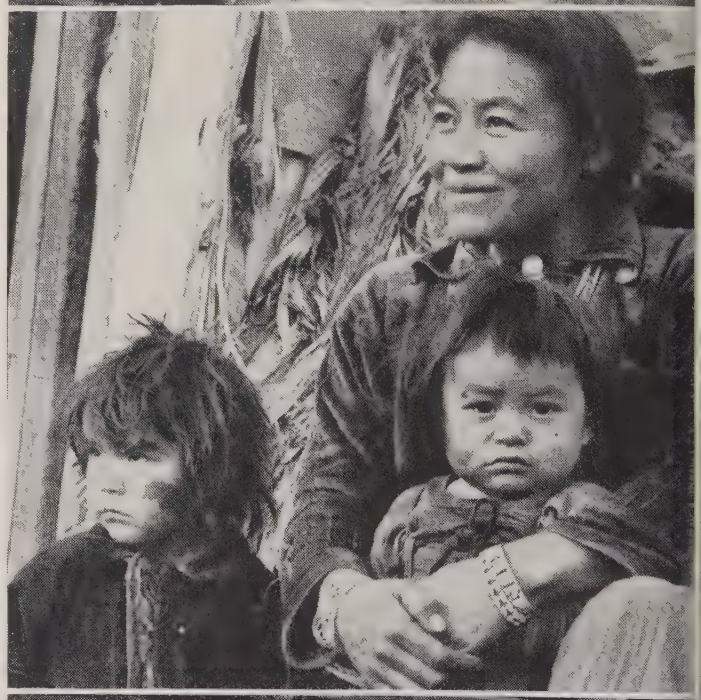
Mr. Goldwater was completely at ease as we headed out over the famed canyon. His flying experience, 3,500 hours of it, goes back to 1930. During the war he was chief ATC pilot at Karachi flying B-24's and C-54's for Crescent and Firebolt.

Words alone will never describe the beauty of the Grand Canyon from the air. If you've never been there, put the flight at the top of your cross-country list, and you'll never regret it.

Upstream along the Colorado River from the Grand Canyon, the *Navion* cruised in calm air over Marble Canyon where the paved road from St. George, Utah, bridges the river. The airport here, a 4,000-foot sod runway at about 4,000 feet above sea level, is adequate for landing a DC-3 or similar tranports.

From Marble Canyon to the Rainbow Lodge, there is nothing but gorgeous scenery: beautiful—but rough walking-out country! "When you fly over this country," said our pilot, "always have plenty of gas and oil, a canteen of water, a sleeping bag and some rations. There is always a place to land without getting hurt, but you may take a day or two in walking to some sort of civilization."

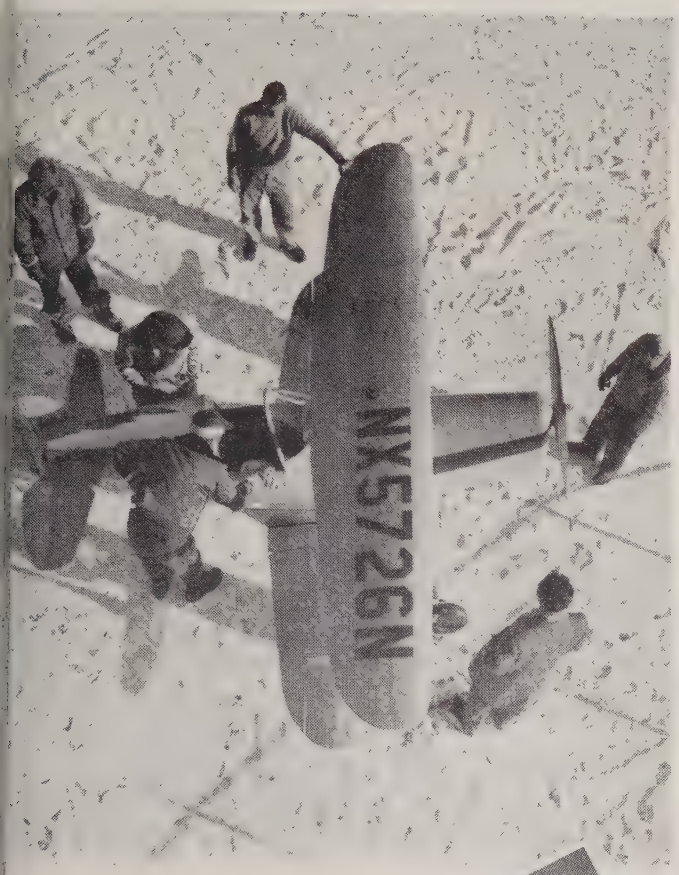
The strip at Rainbow (*Continued on page 48*)



TOMBSTONE, UTAH, is set for Western movies. Indians there sometimes work as "extras" but jobs are few, far between

NAVAJO INDIANS enjoy rides Mr. Goldwater gives them, but if Pilot Goldwater does not make an occasional trip to the lodge, the Indians plant corn on his airport. Air trip from Trading Post to Flagstaff takes 45 minutes

BABY RACER



Special to Skyways by Michael Harris

IN THE days before World War II, much of the design progress in private aircraft came as the result of experiments in design and construction of the so-called backyard home-made planes. There was hardly a pilot in the 30's who had not at one time or another built himself a plane . . . and it usually was a single-seater racer.

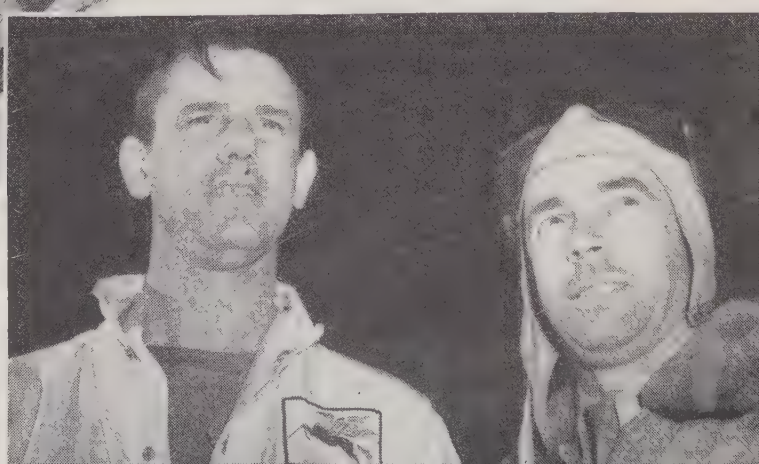
Perhaps inspired by the Goodyear and Continental races for midget planes, there's been some return to this build-a-plane-yourself trend. And Edward O. Effenheim of Milwaukee, Wisconsin, is one who has come up with a tiny racer that is interesting lots of pilots. With a wingspan of only 15 feet and a total weight of less than 500 pounds, the tiny racing plane recently was given its first test flight at Milwaukee's Curtiss-Wright Airport. Test Pilot Robert E. Huggins did not run off any speed tests but he did put the little ship through a few paces and reported she handled beautifully . . . with one exception: "the tail controls were a little strong, but the builder deliberately built the tail a little too large for the tests, and he plans to make it smaller before using it as a racing plane."

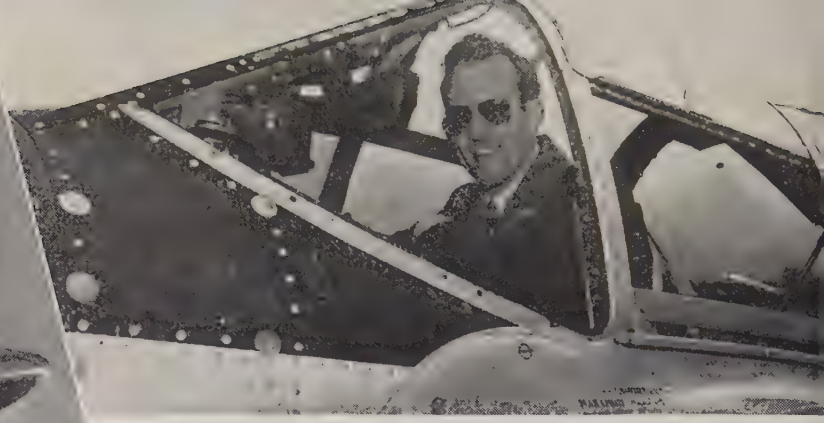
The plane cruised at a nice 130 mph, and handled well throughout the stall tests. The ship is powered by an engine built to Effenheim's specifications by the Tank Brothers Engineering Co. Constructed of plywood and covered with doped parachute silk, almost everything in the plane is a product of Milwaukee. The project cost $500.

TINY RACER is out-weighed two to one by the six interested men giving her a once over

PILOT Huggins and Designer Effenheim check a strut on the tiny ship after first test hop

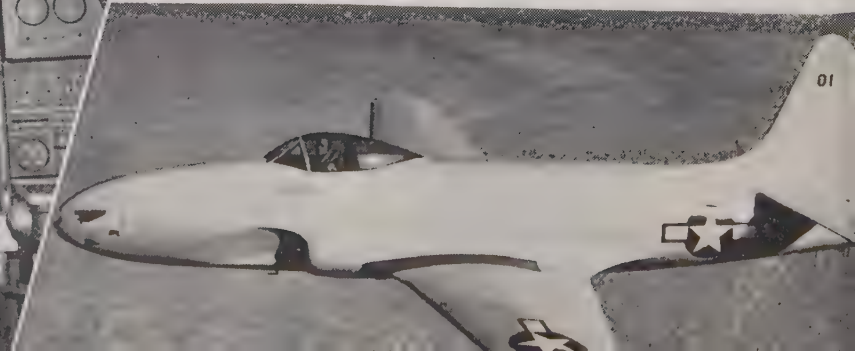
DESIGNER Effenheim (*left*) is 34-year-old student pilot so test flying was left to Huggins





TEST PILOT LEVIER, shown *(above)* in the cockpit of P-38L, did much of the P-38's flight testing, then went to England to demonstrate it to fighter pilots. Prior to P-38 job, LeVier was the man to put the famed *Lodestar (left)* through its paces

COCKPIT of the *Lightning (above)* is vastly different from the "flight office" of the *Constitution (left)*, another Lockheed plane that LeVier flight tested. Being Chief Engineering Test Pilot for Lockheed means flying them all, including *(below)* P-80



LOCKHEED became LeVier's boss back in 1941. One of his early test jobs was on the PV-1 *Ventura (above right)*. One of his latest has been the P-80. For it he wears the G-suit *(left)*

Tony Le Vier . . . Test Pilot

By WILLIAM R. NELSON

ANTHONY WILLIAM (Tony) LeVier is a test pilot who flies top secret experimental airplanes over Hollywood. He is also handsome, over six feet tall, and has a movie star's well-tailored look. But right there Tony's similarity to moving picture test pilots begins to taper off.

As everyone who has seen an "aviation" movie knows, a test pilot is a hero who: (1) brings an "XP" fighter out of a screaming five-minute 9-G dive to win the girl, the contract and the war; or (2) nobly sacrifices himself so the cocky young engineer will learn a lesson, get the girl, and save her father's aircraft company from bankruptcy.

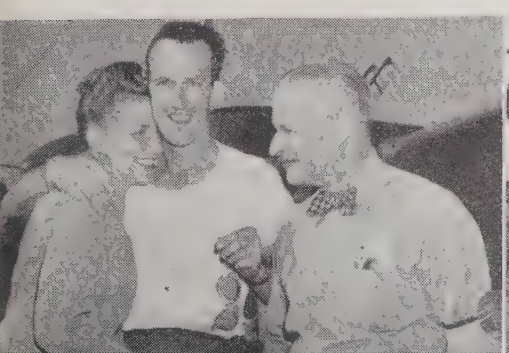
Tony LeVier's flying has come close to conforming to both of these well-known formulas, but somehow his 9-G dives have failed to bring about such complete and compact results. And Tony's one and only bail-out happened during an unspectacular level flight. Instead of winning the girl, foiling the villain, and bringing back air supremacy to the U. S., its outcome was a short stretch in the hospital and a report on what went wrong.

Prior to that, Tony's 20 years of flying were devoid of the excitement movie audiences have come to expect when the story is about a test pilot. He got his license at 19, barnstormed a while, taught flying, flew in some air races, co-piloted on an airline, and was test pilot for a motor manufacturer.

Joining Lockheed in 1941, he ferried *Hudson* bombers to Montreal, flew shake-downs in P-38's, taught Gen. Jimmy Doolittle's *Lightning* squadrons some tricks over England, became an engineering test pilot, and three years ago was promoted to Chief.

As Chief Engineering Test Pilot, Tony has taken (*Continued on page 57*)

SOHIO RACE winner in '47 at Cleveland, Tony hugs his wife *(below left)* while she accepts congrats of Ben Franklin, NAA prexy. His midget racer was christened by daughter, Toniann



Cockpit Meteorology

CAUGHT by thunderstorm fly over saddleback if your airplane can climb that high

THEY buried Joe Doakes today . . in a fog almost as thick as the one that got him. Joe was a pilot with a lot of know-how (he thought!), an ace flyer who really knew how to push a winged wagon through the sky. Trouble was Joe forgot a lot of things, like mailing that letter for his landlady, turning off the lights in his car, winding his watch . . . or checking the weather before he took off on that long X-C in his practically brand new four-placer.

Of course, all the gang at the airport hated to see a nice guy like Joe get it, but there wasn't a pilot among 'em who didn't call it a case of "pilot error." It wasn't the weather that got Joe. Sure, the weather was there, but Joe didn't *have* to waltz right into it. And he wouldn't have if he'd taken an extra 15 minutes to check weather reports and teletypes of conditions enroute to where he was going. A small but well-applied dose of cockpit meteorology would have kept Joe's name out of the obits and private aviation from another black eye.

Cockpit meteorology is knowing what's ahead of you, weather-wise, and how to handle it smoothly so that it won't handle you roughly.

Weather is always of major importance, whether you're flying a strictly contact ship or are at the controls of a plane with an all-weather panel (and an instrument rating in your pocket). The pilot who knows the weather conditions along the air route he plans to fly, and who knows what changes are likely to occur, is the pilot who is prepared to judge correctly the advisability of making the flight, and who won't make it if the signs aren't all in his favor.

There are three major weather hazards to safe flight—fog, thunderstorms, and icing. Knowing what conditions cause fog, the pilot who is a good cockpit meteorologist can anticipate those conditions and take advance precautions against being caught by them. Similarly, the pilot who recognizes the sign of a thunderstorm can escape it. And so for icing, too.

Without going into scientific meteorology (you get that in Ground School and out of CAA Bulletin

KEEP OUT of thunderhead's dark spots if you should be up in storm. Area is rough

BEST SPOT to be in when a thunderstorm rolls up is on the ground at the airport, with ship tied down or hangared

#25, *Meteorology for Pilots*), fog is a cloud on or near the ground. A rule-of-thumb commonly used among pilots is that when temperature and dew point are within 3 degrees of each other, watch out for fog within an hour. That's a good "rule" to keep in mind when you're checking weather data.

Fog usually forms at night, as the result of the air being cooled by its contact with the ground. It also forms when surface winds carry air over a terrain that permits some saturation, or when rain or snow fall into colder surface air.

Ground fog forms in the night-cooled surface air. It gets its start in valleys or hollows, in patches which later join to form a layer that becomes deeper and deeper until sunrise when the air becomes warmed again and the fog disappears. The Pennsylvania hills and mountains are good examples of areas where this fog occurs frequently.

Advection fogs are more prevalent in winter or spring when warm, moist gulf air blows over cold ground or snow further north. This kind of fog can spread for miles and miles and occurs frequently in middle western and lower Great Lakes regions.

Sea-breeze fog prevails along the coastlines. The cool water next to warm land, plus a sea breeze, can form and spread this fog within a few minutes.

Precipitation (rain) fog is usually associated with a warm front. More often than not it is preceded by low, broken scud clouds or a stratus that thickens toward the ground. This type of fog, like the others, can spread far very fast.

In hilly or mountainous country you're apt to encounter so-called upslope fogs. This develops with uphill winds, and is found in the Appalachian area and in the far western U. S.

According to a study by the U. S. Weather Bureau, dense fogs occur most frequently along the West and East Coast. A strip extending from northern California to the north end of Washington averages from 40 to 50 days of dense fog each year. Inland from this section and extending to the southernmost point of California, the days of fog average between 20 and 30 a year. On the East Coast, fog prevails 60, 70 and 80 days a year along an area extending from Massachusetts down to New York City and a part of New Jersey. Along the Maine Coast fog prevails about 50 days of the year. Inland from this coastal area and stretching through to the Dakotas, Nebraska, Kansas, Oklahoma and a part of Texas, fog is in evidence from 10 to 20 days of the year. There is only one section where fog is seldom encountered, and that's a belt that includes Montana, Idaho (southeastern part), most of Wyoming, Utah, Nevada, most of Colorado, Arizona and, of course, New Mexico. Over the Allegheny Mountains in southern Pennsylvania there is a predominance of (*Continued on page 55*)

FLY through opening like this only if you can clearly see beyond it. Keep away from turbulent cloud rims

By C. J. STEMBER

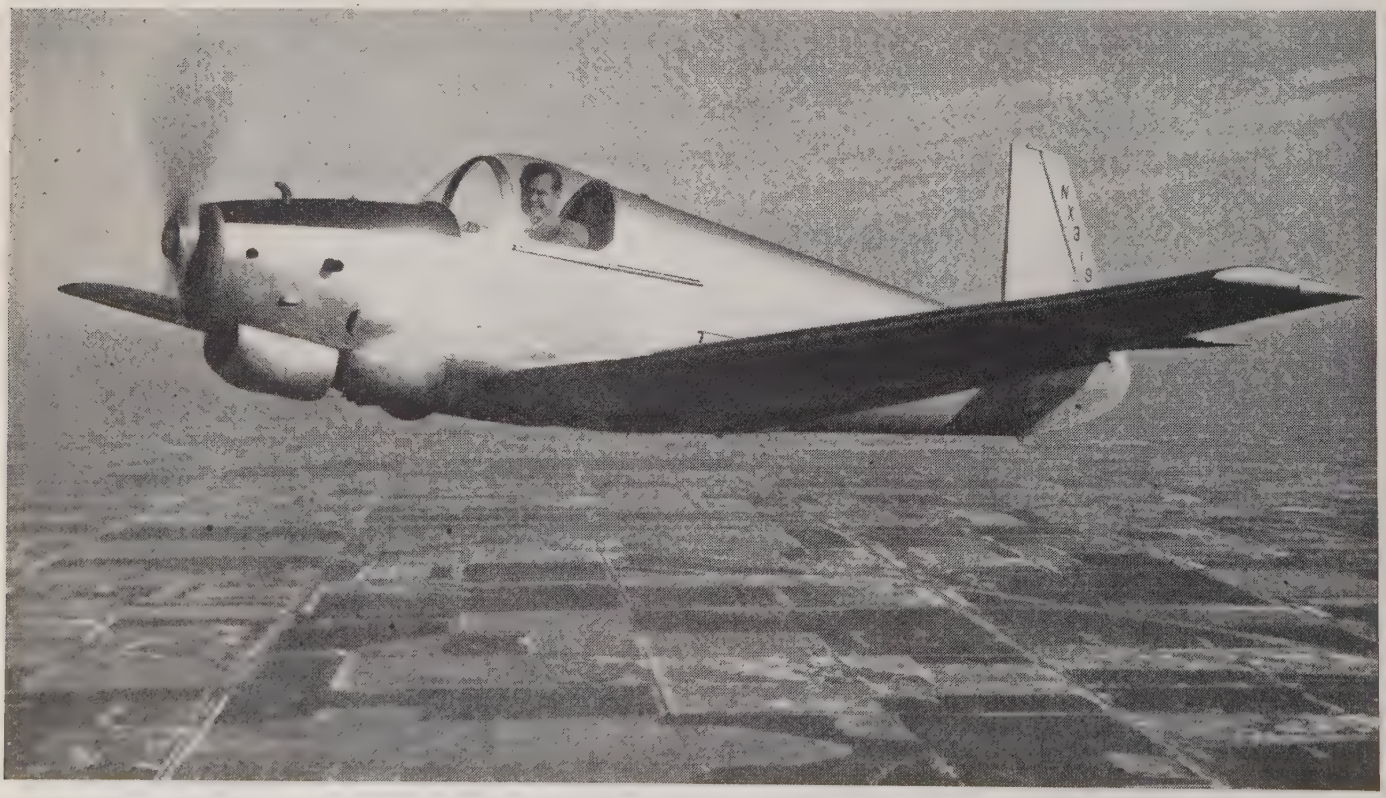
As told to D. N. Ahnstrom

CEILING permitting, you can fly beneath storm and between rain areas, but only in emergency. Down on the ground is best

MOONEY
Single-Seater

YESTERDAY'S need of a five-cent cigar has given way to today's desire for a vest-pocket airplane, if one is to believe the conversation heard in hangar sessions. And maybe Al Mooney, veteran aeronautical designer, is answering that need with his most recent plane-brainchild. After having designed 20 different aircraft, Al Mooney now has come up with a single-seater that should start Mooney fan clubs among the younger members of the aviation set. Powered by a 26-hp Crosley engine (the same that is used in the midget Crosley car), his vest-pocket plane cruises at 90 mph, has a top speed of over 100 mph, and a ceiling of 16,000 feet. It lands in the low 30's on a really rugged landing gear. The ship has a 27-foot wingspan and is 18 feet long. The entire tail of Mooney's ship is controlled as a single unit, thus making the plane a type of Simpli-fly ship. At cruising speed, the plane burns less than 2 gallons of gas per hour. Reduction gear on the engine reduces its 3900 rpm to 1950 rpm, making ship quieter. Like it?

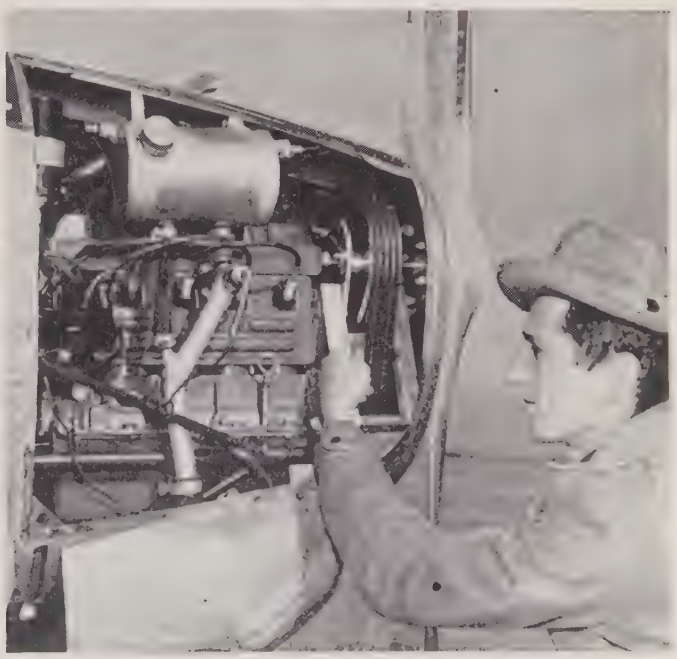
PLANE'S TAIL is operated as single unit. Ruler shows where tail rests in normal position. Arc is little better than 7 degrees



TRIM LINES of Art Mooney's plane are clearly shown in this flight shot. Aside from excellent handling characteristics, the ship's performance is exceptional—cruises at 90 mph, has a top speed over 100 mph, and lands easily in low 30's

SINGLE-SEATER ship, powered by the small 26-hp Crosley engine, uses less than 2 gallons of gas per hour at cruising speed. The gasoline tank, in the fuselage aft of the cockpit, holds only 8 gallons, but that amount is good for 4 hours

CLOSE-UP SHOT of Mooney's plane, flown by test pilot Bill Taylor, was made from a *Cub* 10 feet away, slightly above



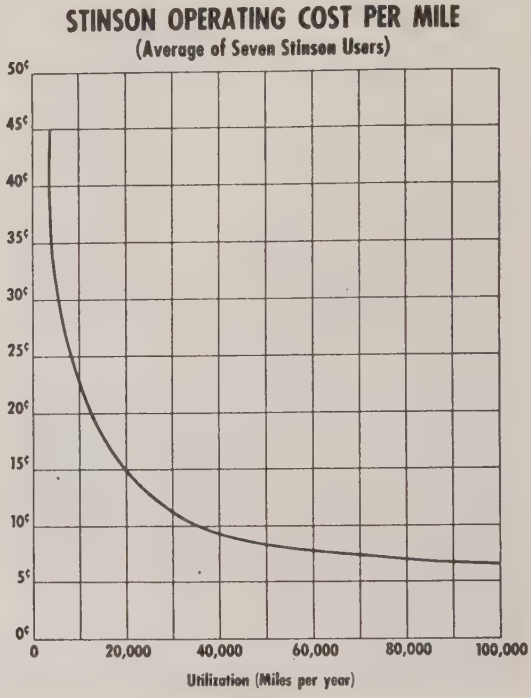
ENGINE that powers plane is geared down from 3900 rpm to 1950 rpm by Goodyear cable belts. The engine weighs 59 lbs

PROFIT in

By DEL ARMSTRONG

PLANE-OWNER L. D. Shannon, of Tulsa, Okla., commutes by plane between feed stores, and checks year's crop

OPERATING-COST record of Shannon's plane proved it paid for itself in six months and is now bringing in a profit



STORE-OWNER H. R. Wood, of Grady, Ark., uses his ship to check cattle, acreage; reports he can't afford not to fly

PLANE OWNERSHIP

Companies find their planes add profit to business

IT'S a typical American custom for a purchaser to get all the answers before he decides definitely on the purchase, particularly when that purchase involves sums in the vicinity of five or six thousand dollars. In the purchase of an airplane the "answers" mean a cost analysis:—"What is plane ownership and operation going to do to the bank account?", the tender spot in anybody's life.

To get a truthful answer to that, we first picked out a useful airplane, then queried several owners. These owners not only convinced us of the practicality of owning and operating an airplane, but they showed us profit in it. And in this day of lagging profits, the reports of these plane owners prove an inspiration and provide renewed hope.

One of the most useful airplanes on the market today is the Stinson *Voyager*, or its farm counterpart, the *Flying Station Wagon*. A four-place plane powered by 165-hp Franklin engine, the *Voyager* has an extra baggage capacity of 100 pounds in addition to its carrying pilot and three passengers. If, in the case of the *Flying Station Wagon*, the only occupant is the pilot, it has a cargo capacity of 640 pounds. This and its excellent performance characteristics make the *Voyager* a good airplane for business use. Interior appointments and comfort of both versions of the Stinson make them ideal as executive ships or utility cargo planes.

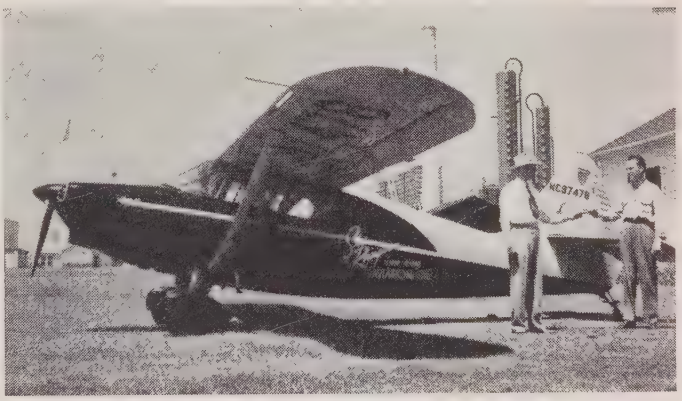
Aside from the Fixed costs of owning and operating an airplane, the cost figures that govern purchase of an airplane (that is, aside from initial cost) are the Variables. Variable costs are those incurred when the plane is in flight, *i.e.*, fuel and oil, and maintenance. Fixed costs involve depreciation, insurance, hangar rental and miscellaneous costs.

Seven Stinson owners were queried, and the cost figures they provided were averaged to give a $-picture of plane ownership and operation. Each of these seven plane owners uses his airplane in a business way, thus enjoying full benefit of the Stinson's utility. Here's how the costs showed up:

Variables	*Per flying hour*
Fuel and Oil	$2.46
Maintenance, Repair	1.68
Total Variable per hour:	$4.14

(*Continued on page 50*)

SINCLAIR CO., of Detroit, uses *Voyager (above)* for trips to Chicago, Columbus, Pittsburgh and W. Va., coal centers



PREMIER OIL CO., of Texas, operates several company airplanes, but a favorite is four-place Stinson *(above)* used by salesmen who fly all over contacting customers. Company *(below)* has a landing field at its very doorstep

"Dilbert gets *all* the brakes . . . and another plane bites the dust"

DILBERT

By Seth Warner and Robert C. Osborn

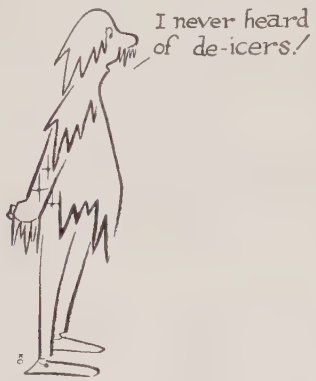
Psycho-Analysis of an Accident—Did you ever wonder how you would react in an emergency? Here is the reaction of a pilot with 450 hours solo, when he got caught in a snowstorm.

He was flying over Lake Michigan at low altitude in a plush single-engine job, when he suddenly ran smack-dab into it. In case you have never flown in a snowstorm, it is just like flying in a heavy fog. If you have never been mixed up in the latter, keep on being smart!

When this sudden snowstorm enveloped him, the pilot immediately went on instruments, started climbing, and headed for the beach. His rate-of-climb and airspeed indicators ceased to function at 3,500 feet, and his engine quit a few minutes later. He made a fair landing 300 yards from shore. Fortunately, a small boat happened to be near by and promptly fished him from the icy water.

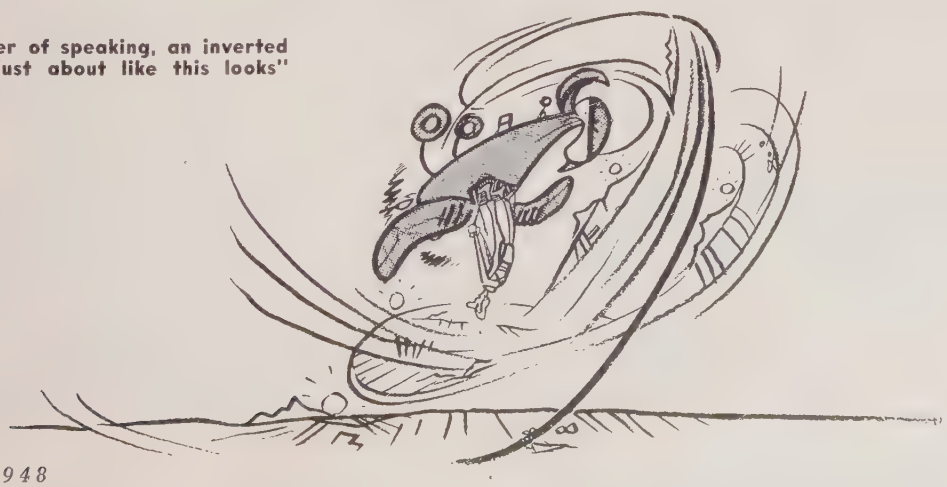
At first glance, it looks as though the pilot reacted pretty well in this emergency. He immediately went on instruments, headed for safety, and made a good dead-stick landing under adverse conditions. So far, so good, but think how lucky he was to come down near a boat in such inclement weather. Besides, the whole thing was unnecessary. He simply loused it up himself.

We won't hold him responsible for the unpredicted local snowstorm, but he can't blame anyone but himself for being so far from shore in a single-engine landplane. You might even overlook that unnecessary risk, but I'll be a spavin-legged mule if you can forgive him for not knowing how to use his equipment.



In the first place, his instruments went out because of icing in the pitot tube. This would have been prevented had he turned on his pitot heating unit, but he didn't even (*Continued on page 59*)

"In a manner of speaking, an inverted spin feels just about like this looks"



PLANE with variable-pitch prop can make jump take-off from snow covered field. Prop adds safety to short-field flying

STINSON VOYAGER, using variable-pitch prop *(above)* instead of fixed-pitch, shows 5.9 per cent improvement in cruise performance. On a seaplane, in this instance a Piper *Sea Scout (below)*, there is a 49 per cent improvement in the take-off

Fixed vs.

"OK, God, I'll take over now!" sighed Carl Gulley as his new Piper *Super Cruiser* skimmed over the tree-covered hill at the end of the Eagle, Alaska, field he had just overshot. Fortunately, his automatic propeller had snapped to low pitch when he gave it full throttle after his airspeed had dropped below 50 in a long and dangerous float down a sloping field.

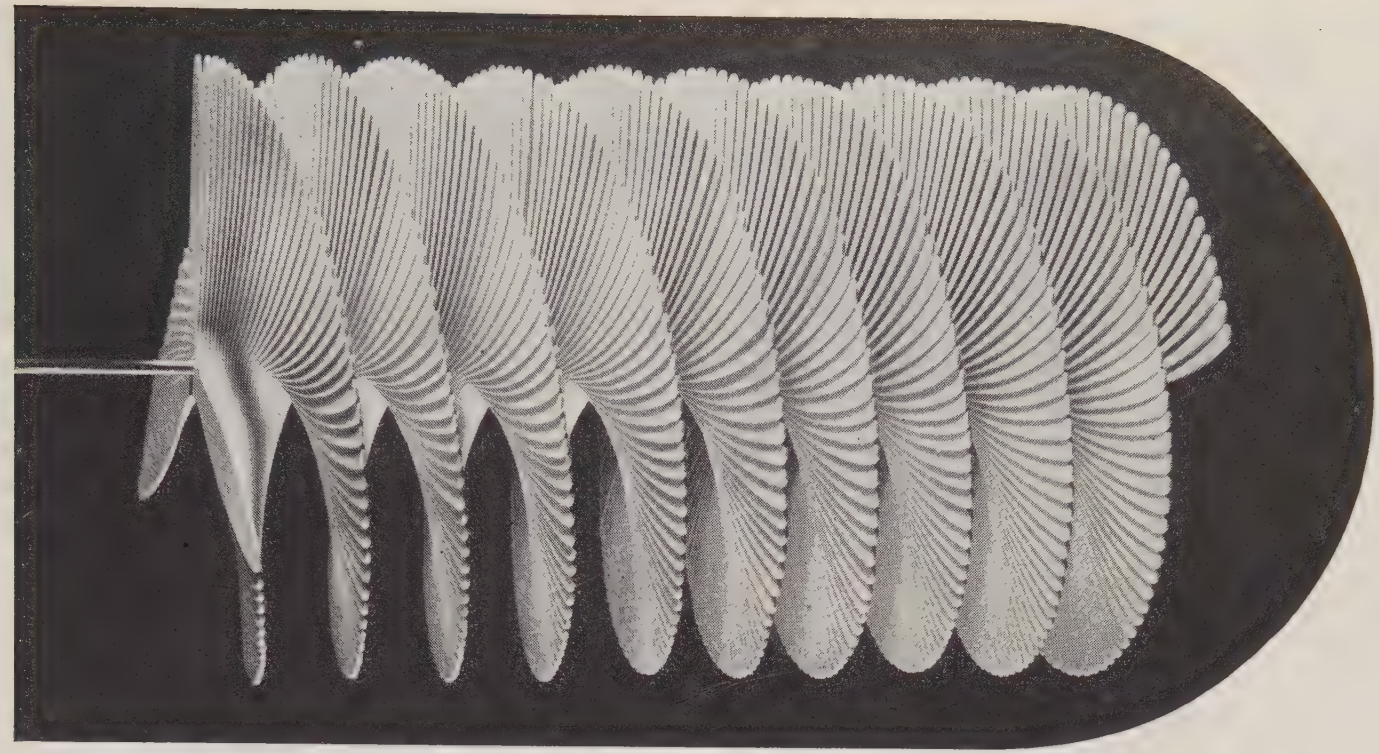
The Eagle field is in a traditionally rugged Yukon setting. One end drops 30 feet to the Yukon River, while the other is buttressed against a steep hill. Worse yet, a blanket of solid snow concealed from Gulley a slope toward the hill slightly greater than the gliding ratio of the *Cruiser*. But, as Mr. Gulley recounted in his letter to the Aeromatic factory, this wasn't the worst field he had found in Alaska. "Anyhow," he concluded, "Divine aid helps those who have variable-pitch propellers."

In recent years scores of letters have come to propeller makers from pilots like Mr. Gulley, who have found their variable-pitch propellers able to get them out of sticky situations. The situations they have described were naturals for a show-off of variable-pitch benefits. Extended take-off runs at altitude would have washed out several pilots but for that extra margin of power low-propeller pitch made possible. Safe clearance of obstacles, after a take-off run retarded by snow, sand, floats or a marginal field has set many pilots to enthusiastically beating the drum for variable pitch.

After every speed, economy, altitude or load-carrying contest, winning pilots proudly link their variable-pitch propeller with their consummate flying skill. Commercial operators and flying businessmen also have had good words for the extended cruising range, prevention of engine damage, and greater usefulness afforded by a variable-pitch benefits coupled with the acceptance indicated by production of over 7,000 automatic propellers since the end of the war, leaves no doubt that personal flying has adopted variable-pitch propellers.

In spite of the wide and enthusiastic acceptance of the variable-pitch propeller, gripes to the manufacturer and puzzled inquiries indicate that many

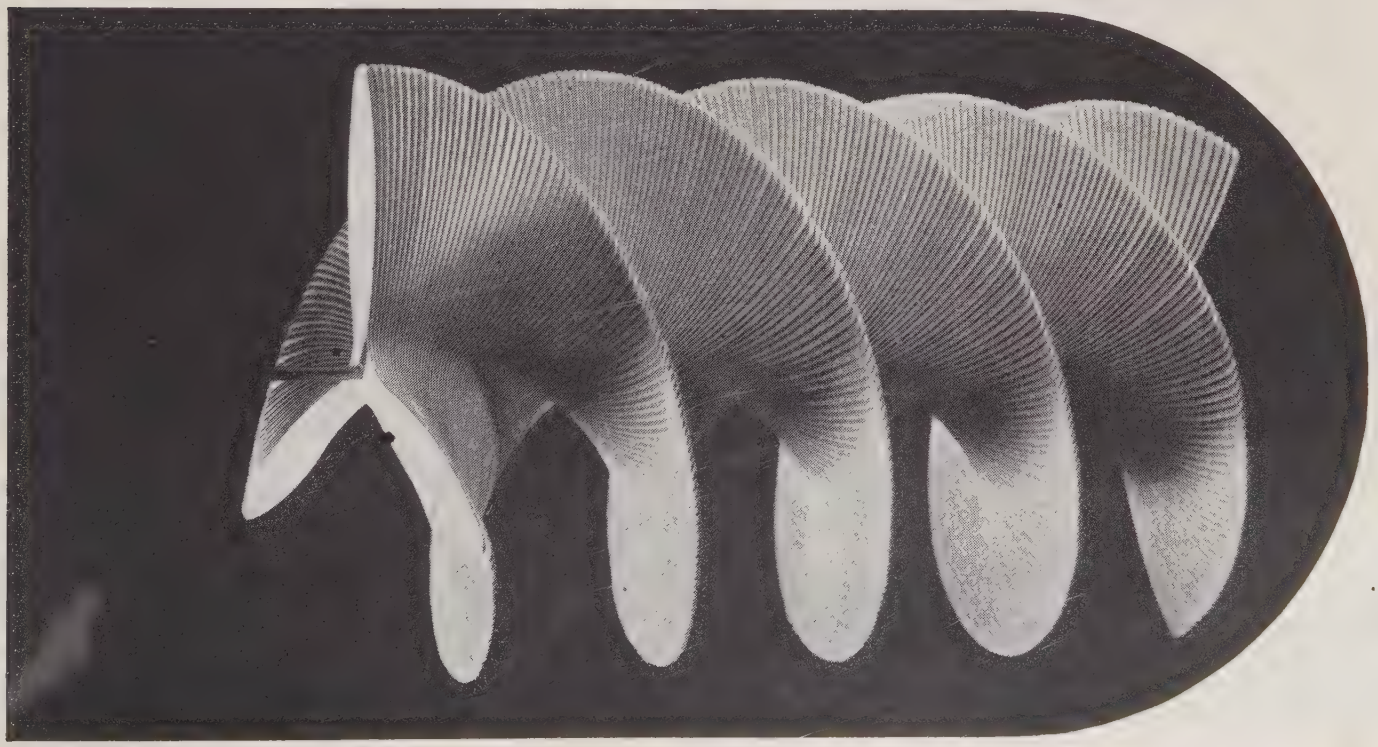
By JOHN D. WAUGH

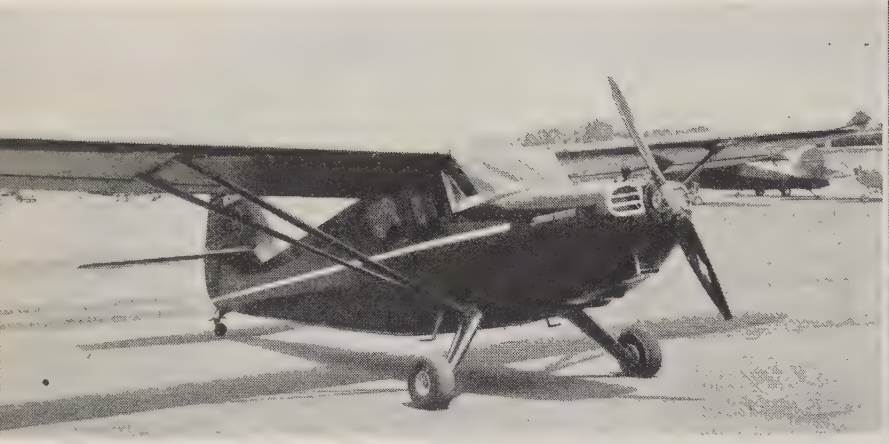


MAXIMUM PERFORMANCE at take-off and climb calls for low-pitch. Spiral path of prop in low position is demonstrated here

Variable-Pitch Props

MAXIMUM SPEED, economy and altitude operation call for high-pitch. Compare spiral path of high pitch *(below)* with low





RATE OF CLIMB with the 165-hp *Voyager* is bettered by 26 per cent (at sea level) with installation of Aeromatic prop

TAKE-OFF run of Bellanca *Cruisair* was improved almost 50 per cent by variable-pitch prop

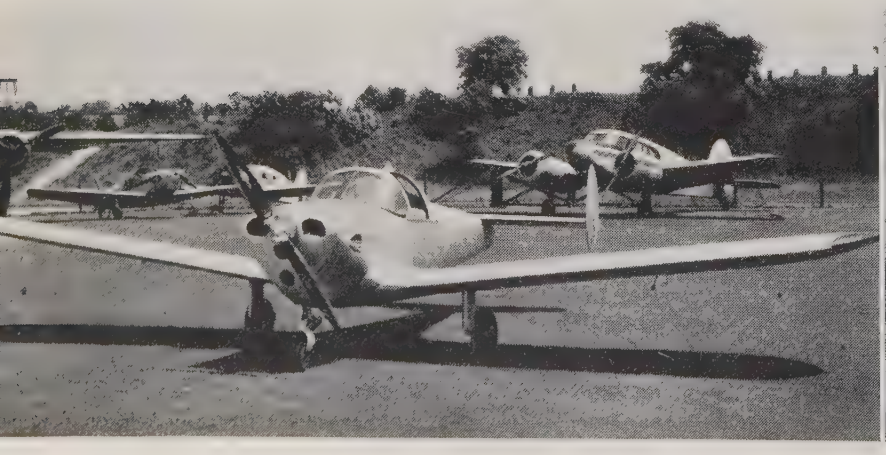
FLOAT-EQUIPPED Piper *Super Cruiser* had its rate of climb improved by about 24 per cent with a variable-pitch prop

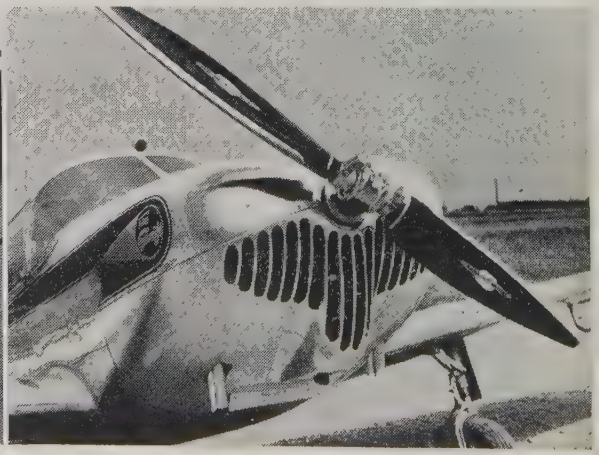
pilots could stand greater familiarity with the technics of variable-pitch operation. One unhappy gent complained that no matter how he climbed or dived, his rpm wouldn't change. "Obviously," he claimed, "there is something the matter with this Aeromatic propeller." A discreet explanation was required in this instance. The propeller was behaving just exactly like it should. The pilot had been accustomed to the wide spread in rpm of a fixed-pitch propeller and didn't understand that an automatic propeller decreases pitch at take-off and climb and increases pitch in flight and diving.

The fixed-pitch propeller, which the automatic type replaces, has an intermediate pitch between low and high. So at take-off, engine rpm is several hundred below rated; and at altitude, high speed, or during diving, rated rpm may be exceeded. The automatic propeller goes to a low pitch for take-off, so that rated rpm and power are available, and then steadily increases pitch during take-off and climb. This function keeps full power applied, yet does not permit the engine (*Continued on page* 52)

ERCOUPE'S rate of climb went from 660 fpm with a fixed-pitch prop to 800 fpm when a variable-pitch prop was used

RATE OF CLIMB of the *Swift* was upped a good 40 per cent by installation of Aeromatic prop





PERSONAL PLANES 1948

EACH YEAR the personal plane is becoming increasingly popular as a profit-making machine of business. Salesmen, store owners, professional men, public service people, farmers and countless others in the business world today are finding the airplane a short-cut to greater sales and higher income. For those pilots who enjoy the utility of a plane, those businessmen who want to see how its done, and for all interested in the new planes on the market, SKYWAYS presents its album of Personal Planes for '48

Two-and Three-Place Planes

AERONCA

CHAMPION A favorite both as a training plane and private aircraft, the *Champion* for '48 offers refinements over earlier models. Cooling system of this year's plane is an improvement over the '47 one, as is the hinged-top cowling over the 65-hp engine that powers the ship. A two-place tandem-type ship, the *Champion* has a cruising speed of 90 mph, a landing speed of only 38 mph, and a range of 270 miles. It can be fitted with floats for water operation at a slight additional cost. Cabin of the new *Champion* is large and roomy with comfortable seats, exceptionally large windows and a one-piece windshield that provides better pilot visibility. List price of the plane is now $2495.00 FAF.

SUPER CHIEF The two-place side-by-side *Super Chief* for this year is basically the same as the '47 model. A new hinged-top cowling provides easier maintenance of the engine, and the cooling system is an improvement over earlier ships. Other change is the upholstery that offers greater resistance to soil and wear. Powered by 85-hp engine, the *Super Chief* cruises at 95 mph, has a landing speed of 38 mph, and a fuel capacity of 23 gallons. Carrying pilot and passenger, the plane's baggage allowance is 70 lbs. Standard equipment on the *Super Chief* includes mechanical starter, muffler, soundproofing, toe brakes, parking brakes, twin glove compartments, twin ash trays and adjustable seats. Price of Aeronca *Super Chief* remains $2755.00.

STATION WAGON Designated Model 7DC, the new Aeronca *Station Wagon* is a ship designed to meet the needs of the farmer. Powered by an 85-hp Continental engine, the new *Station Wagon* can carry 220 lbs. of cargo in a cargo space that measures 24 cubic feet. Utility of this plane is further enhanced by a simple conversion operation which permits the owner to easily re-install the rear seat. The *Station Wagon* cruises at 92 mph and has a total fuel capacity (with auxiliary wing tank as standard equipment) of 18.6 gallons. List price of the '48 Aeronca *Station Wagon* is $2665.00 FAF. Owner of the standard Aeronca *Champion* can easily convert his ship into a *Station Wagon* via a complete cargo kit sold by Aeronca for $35.00.

AERO-FLIGHT

STREAK Called by many "the fastest personal plane on the market," the *Streak* lives up to that reputation by having a high-speed placard of 270 mph. Powered by 125-hp Continental engine, the two-place tandem-type *Streak* cruises at 192 mph, has a 1500 fpm rate of climb, and a range at cruising speed of 600 miles. Design stress analysis of the ship is 7 g's, fully acrobatic. At cruising the ships gets about 30 air miles to the gallon of fuel. Its landing gear is retractable, and the ship has a baggage capacity, with full load, of 50 lbs. Seats are adjustable and the cabin is fully soundproofed. List price has been set at less than $4,000 FAF.

CALL AIRCRAFT

CALLAIR Designed by a mountain-flying pilot for mountain flying, the *Callair* is rated in the high and rocky Northwest as one of the best ever built. It operates out of small, rough fields at high altitude as easily as a training ship at sea level. Powered by 125-hp Continental engine, the *Callair* cruises at 109 mph and has a range of 456 miles. It has a sea-level angle of climb at gross weight (1550 lbs.) of 5.56 to 1 (ratio of horizontal to vertical distance). It seats two or three side-by-side and has a luggage allowance of about 60 lbs. with full load. Price of *Callair* is about $4000 FAF.

CESSNA

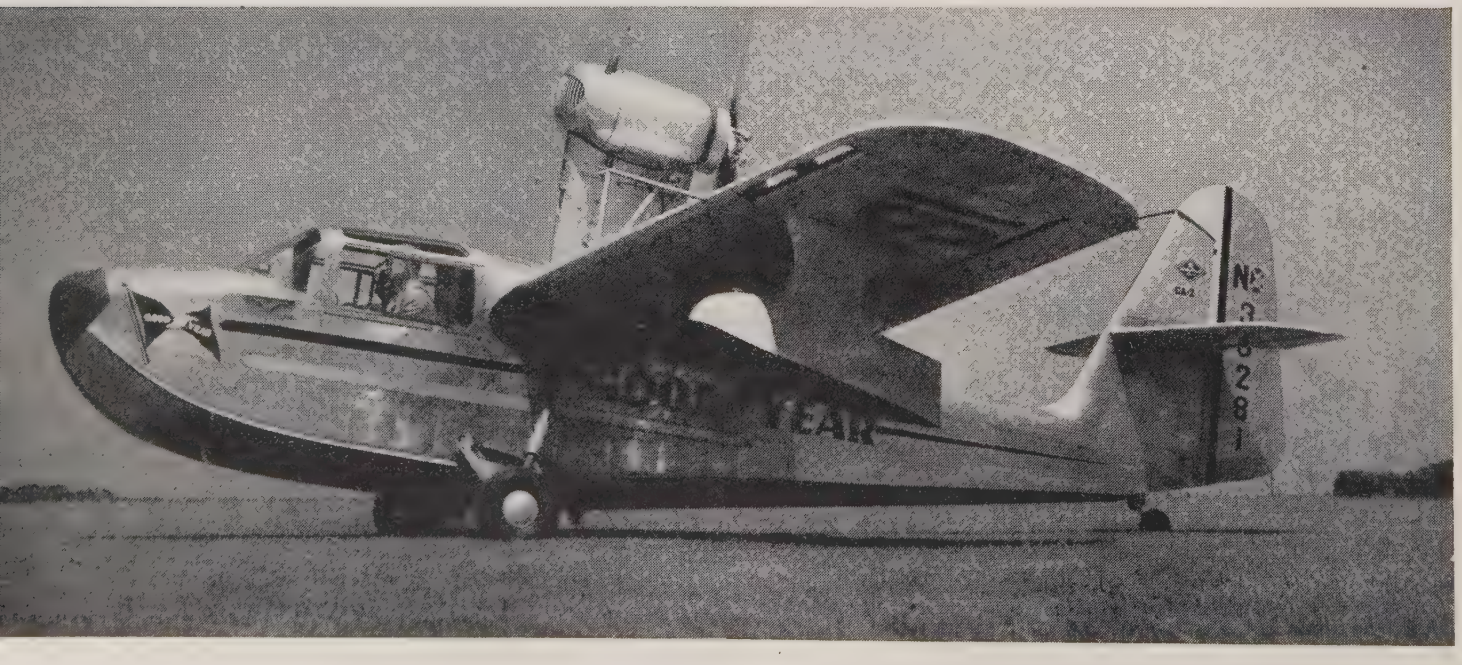
MODEL 140 In the field of light aircraft there is probably no plane easier to handle, more neatly appointed or more comfortable to ride in than this two-place side-by-side Cessna. Powered by Continental 90-hp engine, it cruises at a nice 105 mph, lands at a slow 41 mph and has a range of 4½ hours. Standard equipment includes such extras as cigarette lighter, ash trays, map compartment, starter, wing flaps, etc., as well as regular engine and flight instruments. It will carry 80 lbs. of luggage. Model 120 has 85-hp Continental, lower cruising, etc.—Price: 140—$3345.00; 120—$2845.

FUNK

CUSTOMAIRE Although a lightplane, this trim two-place ship offers performance and cabin comfort of the larger planes. The Funk's stability at low speeds makes it not only one of the easiest to fly but also one of the safest. Powered by 85-hp Continental engine, the *Customaire* has a cruising speed of a little over 100 mph, landing speed as low as 37 mph, a range of 350 miles, fuel capacity of 20 gals. Cabin is soundproofed and offers pilot and passenger plenty of leg room. It has a baggage allowance of 50 lbs., and employs wheel control. Present price of the *Customaire* is $3495.00.

GOODYEAR

DUCK Designated the GA-2, this three-placer is still in the testing stage and whether or not it will be marketed remains to be seen. Powered by 145-hp Franklin engine, the Goodyear amphibian cruises at 110 mph, lands at 56 mph on land or on water, and has a range of about 300 miles. At the present time 15 prototypes are being completed for further pilot testing in various sections of the country. This is to determine how the airplane operates under a variety of conditions and to obtain pilot reactions to various features of the *Duck*. Equipment includes radio. It is not for sale.



LUSCOMBE

SILVAIRE 65 A high-performance lightplane at a relatively low cost, the Luscombe *Silvaire 65* is an all-metal two-place plane powered by 65-hp engine. It cruises at 105 mph, has a range of 600 miles and a baggage capacity of 75 lbs. with pilot and passenger. Standard equipment includes interior appointments, brakes, tie-down rings, etc. It is licensed for float or ski operation. List price is $2695.000 FAF. Luscombe's new model, *Silvaire 85* is similar to the 65 except that it is powered by 85-hp Continental, cruises at 112 mph, range over 650 miles, baggage allowance of 75 lbs. List price for 85 (*Special*) is $2795.00. Both *Standard* and *Special 85* have "S" in a circle instead of a diamond.

SILVAIRE DELUXE 85 Also an all-metal two-place monoplane, the *Deluxe 85* features more luxury appointments in cabin, wheel pants and other deluxe additions. Powered by 85-hp Continental, it cruises 112 mph, range of 650 miles with pilot, passenger and 75 lbs. of luggage. This ship, as well as all the '48 Luscombes, features new Silflex landing gear. Another new Luscombe model is *Silvaire Deluxe 90*. This is powered by 90-hp Continental engine, cruises at 115 mph, range of 650 miles, etc. Both the 85-hp models and the 90-hp ships also feature new Deluxe instrument panel. List price for the *Silvaire Deluxe 85* is $3495.00; for the *Deluxe 90*, $3595.00. Both ships are equipped with Tie-Down rings, door locks, etc. The 85 has the *Silvaire* "S" in a circle on cowl, while the 90 has the "S" in double circle on the cowl. Cabin appointments are the same and feature deluxe equipment.

MONOCOUPE CORP.

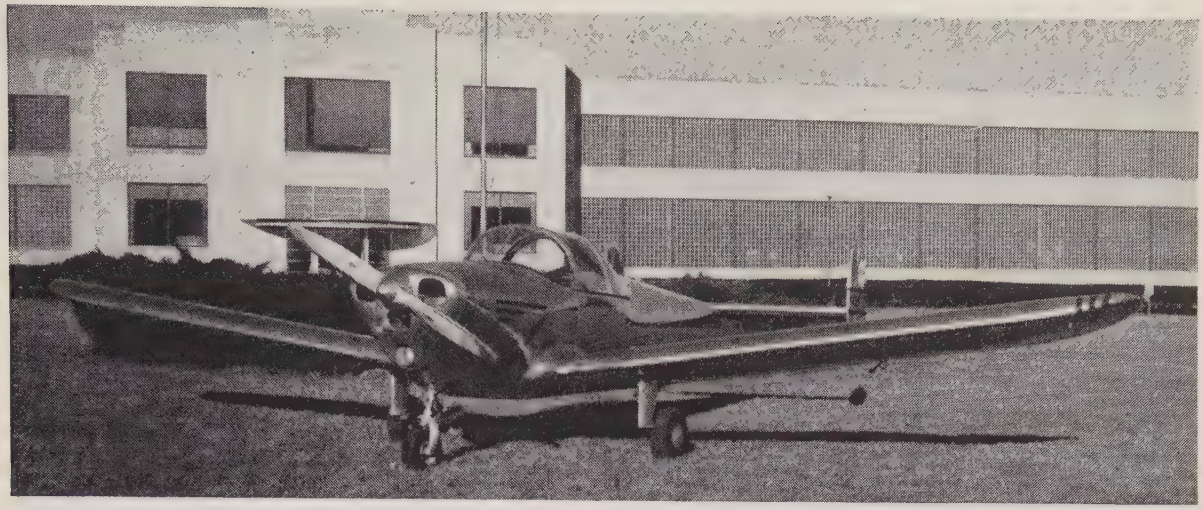
MONOCOUPE Long absent from the field of personal planes, the *Monocoupe* returns a new and improved version of the lightplane that established records back in the late '30's. This new model is powered by 115-hp Lycoming engine, and has a cruising speed of 135 mph, landing speed of 40 mph and a normal cruising range of 600 miles on 28 gallons of fuel, 60 per cent power. It offers improved cabin appointments, instrument panel, etc., and features wheel pants, starter and bonding for radio as standard equipment. A two-place plane, The new *Monocoupe* will sell for $3890.00 FAF.

PIPER

PA-11 The Piper *Cub Special* is the trainer all dressed up for personal ownership. While it retains the design that gave it safety and ease of flying, the new *Cub Special* is finished in two-tones: yellow and blue, the 65-hp engine is fully cowled, and the front seat folds down for easier getting in and out. It also features a larger gas tank to add to ship's range. The *Cub Special* cruises at 87 mph, lands at 38 mph and has a range of 300 miles with pilot and passenger and 20 pounds of baggage. It is licensed for floats (*left*). Price—$2495.00. FAF.

NEW PIPER MODELS Piper Aircraft has three new planes for the '48 market. Photos of these have not been made as yet. The *Cub Special* 90 looks like the *Cub Special* (*above left*), but has larger engine, cruises at 100 mph, and sells for $2572.00. The PA-14, *Family Cruiser,* is a four-place plane powered by 115-hp Lycoming engine that offers an automobile-type cabin interior, radio, etc. It will sell for around $4000.00. The PA-15, *Vagabond,* is a two-place, side-by-side ship powered by 65-hp Lycoming. It will sell for $1990.00 FAF.

PA-12 The 1948 version of the famed three-place Piper *Super Cruiser* includes some refinements over older models. Powered by 100-hp engine, the *Super Cruiser* cruises at 105 mph, has landing speed of 49 mph and a range of 600 miles. It features a two-way radio as standard equipment, plus navigation lights, cabin heater, etc. An electric starter is also considered standard. Like the other Piper planes (see seaplane version, *Cub Scout,* above left) the *Super Cruiser* is available on floats at some extra cost. Price of *Super Cruiser* is $2495.00 FAF.

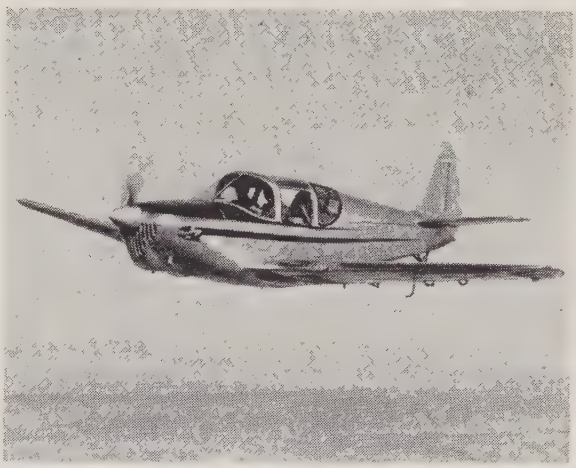


SANDERS

ERCOUPE The 1948 model of the *Ercoupe*, two-place no-spin ship, features utility refinements over the earlier models. The new one is powered by 85-hp Continental engine which gives the plane an improved take-off performance, increases cruising speed and offers 22 miles to the gallon of gas. Increased weight allowance makes it possible to carry extra equipment and baggage without sacrificing the *Ercoupe's* two-place operation. A two-way radio is standard, and a larger nose wheel gives the ship greater rolling action for landings on soft or rough fields. New model Ercoupe is priced at $3590.00.

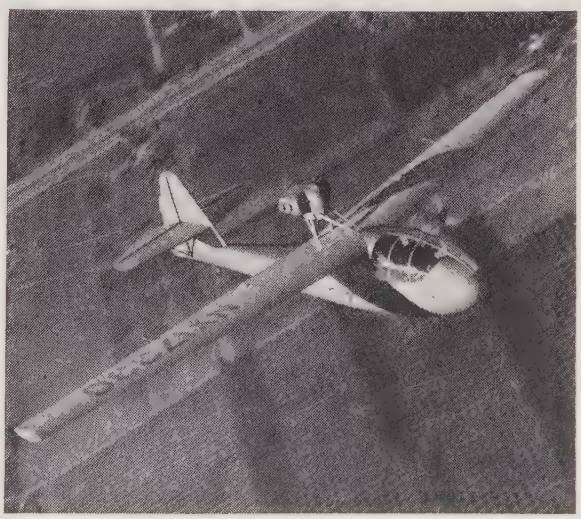
TEMCO

SWIFT-125 All-metal *Swift* powered by 125-hp Continental engine is a two-place high-performance airplane that's enjoying great popularity. Its coupe-style cabin offers those "extras" in appointments that give it comfort and good looks. With pilot and passenger it has 100-lb. baggage allowance. The *Swift* cruises at 140 mph, lands at 48 mph (with flaps), has 425-mile range on 27.5 gallons of gas. Standard model sells for $3,495 FAF, while the Deluxe model, including a radio, etc., is $4000.00.



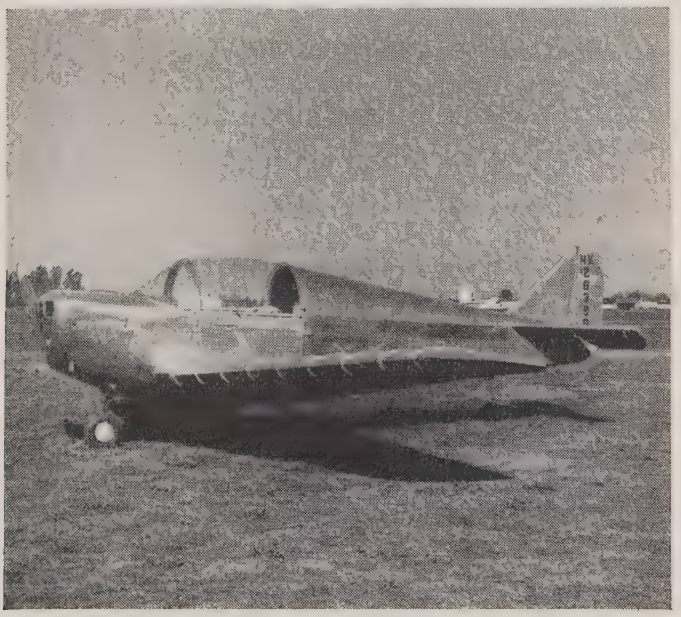
VOLMER

VJ-21 Formerly the Jarvis *Jaybird*, the VJ-21 is a pusher plane built along the lines of a sailplane. Powered by 75-hp Continental engine, the VJ-21 cruises at an easy 100 mph and has a range of 500 miles. Top speed of the *Jaybird* is about 115 mph. This model, the prototype, is a two-place side-by-side ship but, according to reports, the production plane probably will be an all-metal three-place plane with the mono-wheel or tricycle gear a buyer's choice. Unusual feature is the manually retractable wing wheels that support wings while taxiing.



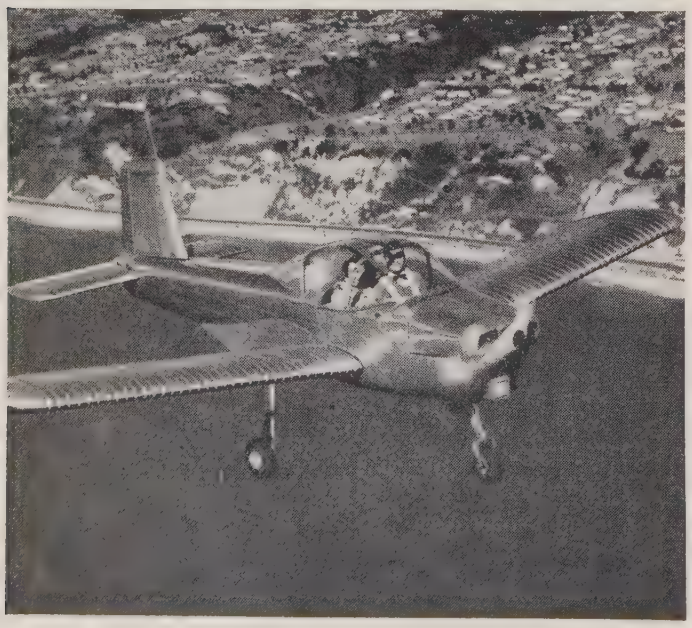
ALL AMERICAN

ENSIGN This two-place all-metal ship has been in experimental stages for a long time, but it is hoped that production on it may get under way sometime this year. Powered by 85-hp Continental engine, the *Ensign* cruises at 110 mph, lands at 50 mph and has a range of 400 miles. Baggage allowance of the tiny ship is 50 pounds. The tricycle gear is not retractable. The cabin of the *Ensign* is upholstered in either blue or red leather and the bubble-type enclosure slides aft for entrance. Sun protection on the plexiglas enclosure is optional. A second version of the *Ensign,* designated 10B01, will be a two-control spin and stall-proof plane, but date of its announcement is far future.



EMIGH

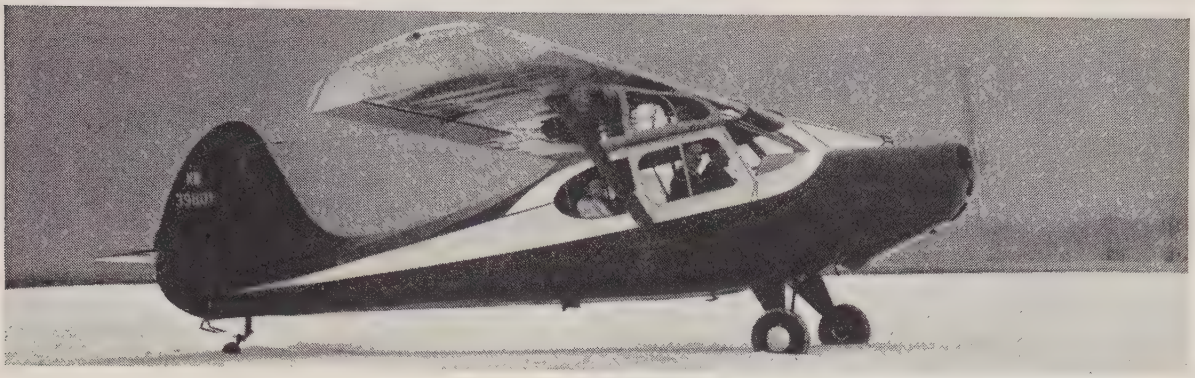
TROJAN Another all-metal two-place ship designed by a West Coast engineer is the Emigh *Trojan.* Like the *Ensign* and several others, this ship is still classified as experimental and no definite production plans have been made. It is powered by an 85-hp Continental engine that is reported to give the tiny ship a cruising speed of something "over 100 mph." It employs full-span ailerons which also serve as flaps and are adjustable from the cockpit while the ship is in flight. It is expected to have a fuel capacity of 30 gallons which will give the *Trojan* a range of about 700 miles. While the landing gear on this prototype is fixed, plans are to manufacture two models—the standard with fixed; and deluxe with retractable.



THORP

SKY-SKOOTER Another lightplane that is still on the indefinite list as far as production plans are concerned is this two-place all-metal *Sky-Skooter.* While its designer-owner John Thorpe has several orders for it on hand, the ship is not yet being manufactured. Powered by 75-hp engines, the *Sky-Skooter* cruises at 120 mph and has a range of 420 miles. The original idea was to build this plane to sell for nearer $1000 than $2000. Manufacturing costs, however, are such that the figure may be nearer $2800, and it is this present-day high cost of plane-production that is delaying real plans for the manufacture of the *Sky-Skooter* at this time.

Four-Place & Executive Planes

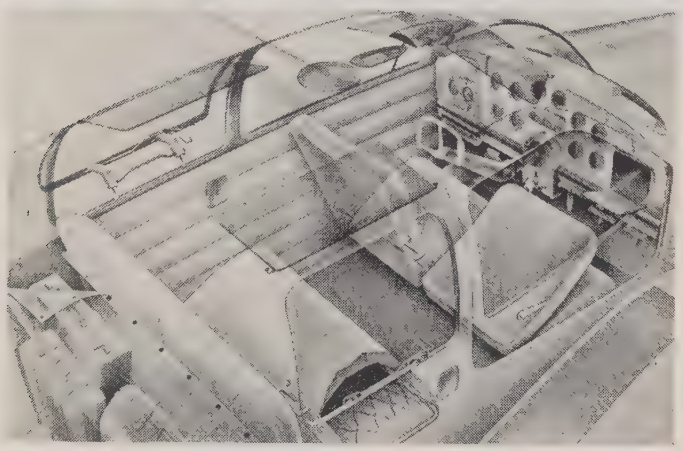


AERONCA

SEDAN By way of introduction into the four-place plans division, Aeronca recently announced its four-place plane. Powered by 145-hp Continental engine, the Aeronca *Sedan* cruises at 105 mph and has a range of over 400 miles. The pilot's seat is adjustable, the front seat folds to facilitate getting in and out, and the rear seats are removable thus providing a spacious cargo compartment for those wanting to use the plane as a cargo carrier. Completely equipped for both day and night flying, the Aeronca *Sedan* is price listed at $4795.00 FAF.

BAUMANN

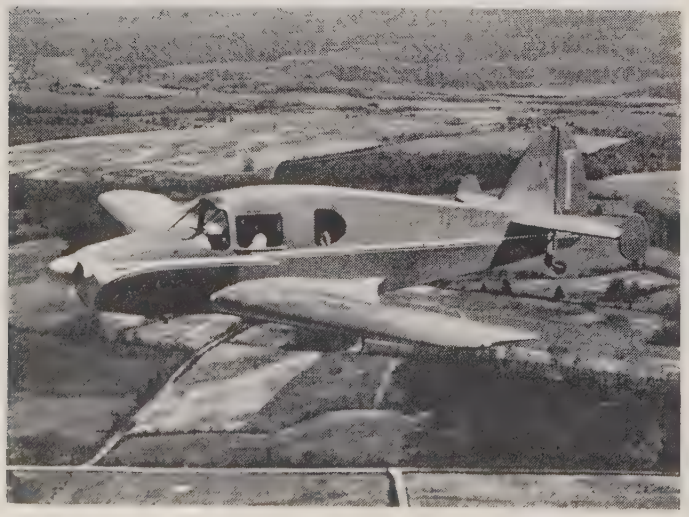
BRIGADIER Designed as an executive transport, the Baumann *Brigadier* is a twin-engine plane adaptable for light cargo, ambulance or photographic work as well as personal transport. Powered by two 125-hp Continental engines, the *Brigadier* seats five and provides ample baggage space. It has a cruising range of 750 miles at a speed over 150 mph. Of all-metal construction the *Brigadier* is a quiet plane to fly or ride in due to its pusher power. Feature of the ship is ease of entrance to cabin, accessibility of engines for maintenance work. Price has not been decided at this time.



BEECH

BONANZA The four-place *Bonanza* is one of the most popular and more widely used personal or executive transports in the skyways today. A deluxe-type ship, the *Bonanza* is powered by 185-hp Continental, giving it 172-mph cruising at 8,000 feet, and 750-mile range. With four aboard, ship has baggage capacity of 120 lbs. Standard equipment includes primary blind flight group, two-way radio. Note interior appointments (*left*). Price—$9445.00

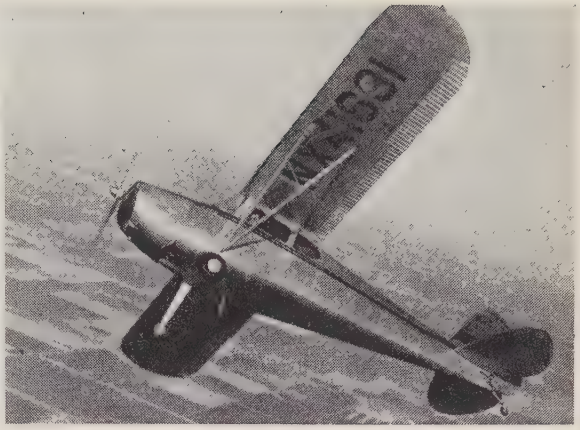
MODEL D18S Leading the field in the twin-engine executive capacity, the D18S is a familiar ship to everyone. Like a junior-size airliner, the twin-Beech carries from four to eight passengers and crew of one or two. Powered by two 450-hp Pratt & Whitneys, the D18S cruises at 211 mph at 10,000 feet, and has range of 1300 miles (with nose tank). D18C looks like the 'S but has larger engines, carries up to nine passengers, has higher cruising and longer range. Fully instrumented, many of these planes have custom-designed interiors to suit executives they carry. Base price is $78,000.



BELLANCA

CRUISAIR SR. The 1948 Bellanca *Cruisair* is essentially the same as the 1947 model. A four-placer, the plane is powered by 150-hp Franklin engine, giving it a cruising speed of 150 mph and a range of over 600 miles at 165-mph cruising. Interior styling of the *Cruisair Senior* gives it sedan look and automobile comfort on long cross-countries. Fully loaded, the ship has a baggage allowance of 50 lbs. Standard equipment includes engine and flight instruments, dual wheel control, usual ash trays, etc. The landing gear of the *Cruisair* is fully retractable. Base list price, FAF, is $6350.00

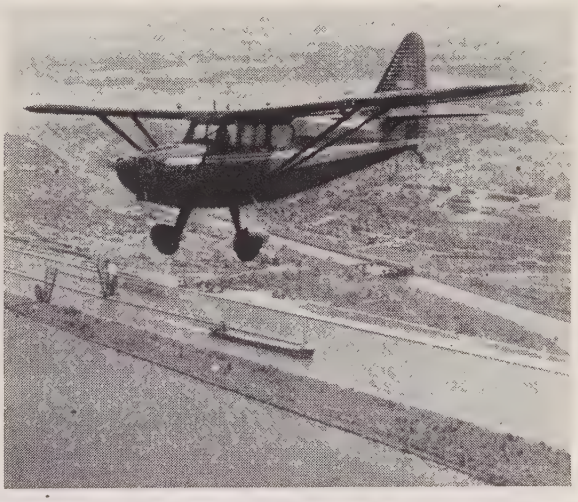
CESSNA



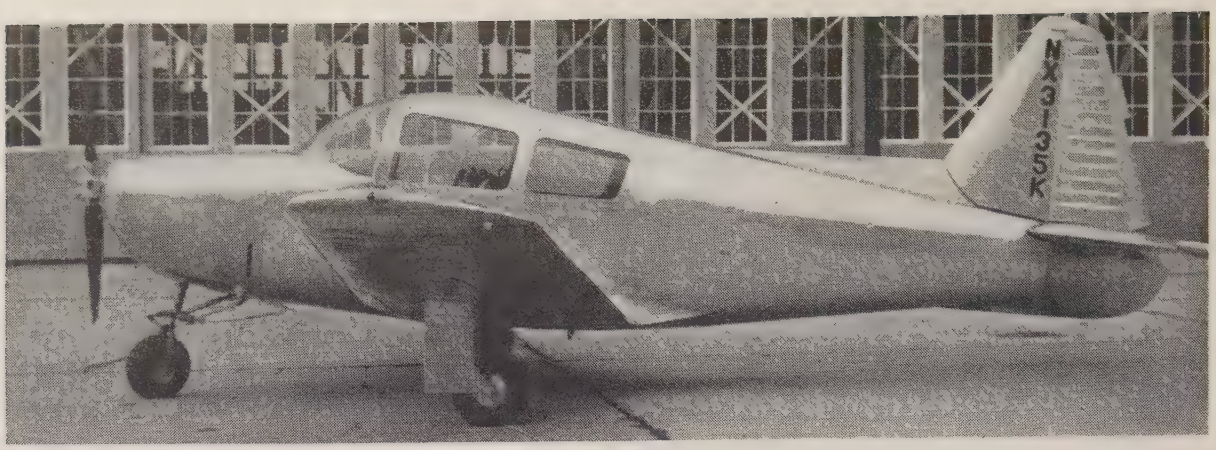
MODEL 170 Newest in the Cessna Aircraft hangar is the four-place Model 170. While no performance figures have been released as yet, we can safely assume that by Cessna standards, the performance of the new 170 is all a plane owner or pilot would want it to be. It is powered by 145-hp Continental engine. Interior appointments are of a "deluxe" design, and the cabin itself is roomy and comfortable for pilot and three passengers. A large baggage compartment is provided at the rear of the cabin. Deliveries begin March. Price—$5475.00.

MODEL 190 Cessna's high-performance, five-place airplane is this Model 190. Powered by 240-hp Continental (195 has 300-hp Jacobs), the 190 cruises at over 160 mph at 7,000 feet (using 70 per cent power). It has a range of over 750 miles on its 80-gallon fuel capacity. Standard equipment on this executive ship includes two-way radio, deluxe cabin appointments, engine, flight instruments, etc. Certificated for floats. Price—$12,750 FAF.

CONVAIR-STINSON



VOYAGER The new Stinson *Voyager,* with its cabin designed by Dreyfuss, is an executive plane at a lightplane price. Seating four, the *Voyager* cruises at 130 mph at 4,000 feet over a range of 554 miles. It is powered by 165-hp engine. Stall warning device is standard equipment. The *Flying Station Wagon* is the *Voyager* designed for utility duty, with the rear seat removed to allow carrying 640 cargo-pounds. Seat can be re-installed easily by the plane owner. Both models are licensed for seaplane or ski operations. Price—$6249.00 FAF.

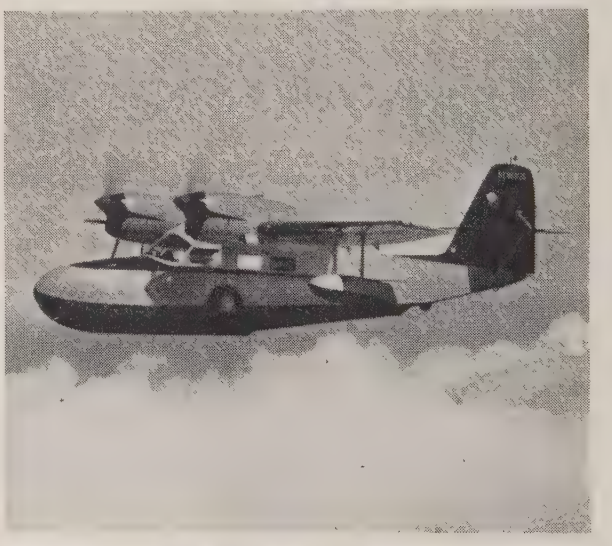


FAIRCHILD

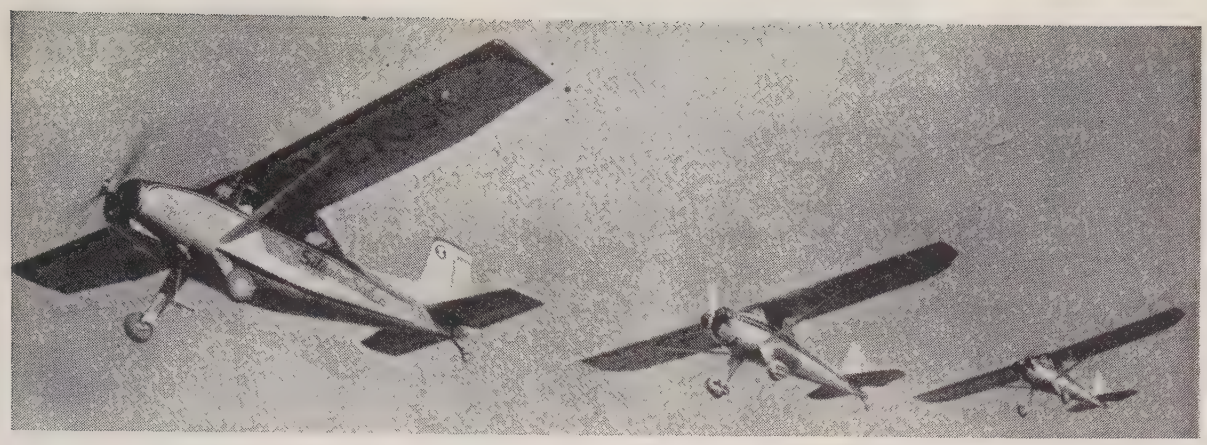
MODEL F-47 (Perhaps this year, F-48) Fairchild has built a few of these ships for testing purposes, but as yet there are no definite plans for production. According to reports, it is powered by 185-hp. Continental engine, giving it a cruising speed of approximately 165 mph, and a range of somewhere around 700 miles. The ship is of all-metal construction, with fully retractable landing gear. The cabin seats four comfortably and includes deluxe interior appointments. Information is very scanty, but we do know it will be a welcomed airplane if and when it reaches the personal-plane market.

GRUMMAN

WIDGEON One of the best all-around executive planes is Grumman's famed *Widgeon*, still enjoying popularity it gained few years ago. Basically, the '48 *Widgeon* is the same as the '47. It is a custom-built amphibian featuring interior decor and appointments to fit specific needs of the owner. Powered by two 200-hp *Rangers*, the *Widgeon's* maximum cruise is 150 mph at 6,000 feet, with a range of 675 miles. Economical cruise is 125 mph at 6,000 feet with 810-mile range. It is a five-place ship. Standard equipment includes two-way radio, turn-and-bank, etc., plus required water-way gear, etc. Today's list price for the amphib is $30,600.00 FAF.



MALLARD For real luxury in an executive ship, the eight to 10-place *Mallard* amphibian offers a custom-designed cabin that resembles a club car. A privately owned *Mallard* recently hopped its owner and guests from the U. S. to England with the ease of a smaller ship flying between New York and Chicago. Powered by two 600-hp Pratt & Whitney engines, the *Mallard* cruises at 215 mph at 6,000 feet, has range of 1,183 miles with crew of two, four passengers and 100 lbs. of baggage. Standard equipment includes flares, full engine, flight instruments, radio, lavatory, usual water gear, etc. Present list price for *Mallard* is $124,600.00.



LUSCOMBE

SILVAIRE SEDAN Luscombe tossed its hat into the four-place field with this new all-metal utility ship that was designed with a special eye out for the needs and requirements of the flying farmers. Powered by 165-hp engine, the *Sedan* will carry either four passengers, or a pilot and 600 lbs. of cargo. With pilot and three passengers aboard, it has baggage allowance of 100 lbs. It cruises at 130 mph and has a normal range of 500 miles. Rear seats are removable (for cargo carrying) and the front seats are adjustable. Large windows afford pilot exceptional visibility. Price—$6995.00 FAF.

RYAN

NAVION The 1948 *Navion* built by Ryan is a plane considerably improved over previous models. New interior styling, improved ventilation, new sound insulation and fuel system, plus high-gloss exterior finish makes the *Navion* one of the best looking and flying four-place planes on the market. Powered by 185-hp Continental engine, the '48 *Navion* has cruising speed of 150 mph and a range at that cruising of 750 miles if the auxiliary 20-gallon fuel tank is installed (optional). The ship's stability in rough air, landing characteristics, roominess of cabin, good visibility make it popular as an executive ship. Price—$8750.00 FAF.

SANDERS

ERCOUPE FOUR Not yet in production, but with hopes high Ercoupe offers its first in the four-place field. Of all-metal construction and with the same non-spin flight characteristics, the four-place *Ercoupe* will be similar in most respects to the two-place. The engine that will be used is not known at this time, but it probably will be a Continental. Interior appointments will be along deluxe lines, and the cabin will be roomier for four than the two-place is for two. Wide door offers easy entrance to the ship. Price—near $6000.00 FAF.

NAVAJOS live in huts, like this wood and dirt "hogan," during the wintertime

Navajo Navion

(*Continued from page 20*)

Lodge, owned jointly by Mr. Goldwater and trader Bill Wilson, is easy to find from the air. The 10,416-foot Navajo Mountain is the guiding landmark and the field is five miles south of the peak. In common with many of the pint-sized fields in this plateau, you land uphill and take-off downhill, regardless of the wind.

"These landing fields are at their best when the ground is frozen hard. In the summer they are a little soft and sometimes we have a tight squeeze in getting off with a full load, so we will probably lengthen this strip before summer," said Mr. Goldwater as we turned on the final approach. The *Navion* came in nicely and rolled to a stop safely clear of the sagebrush at the end of the field.

No sooner had the prop stopped turning than Indians began to appear. They seemed to fairly pop out of the bushes. The Navajos call the plane "Chidi Nadi," the automobile that flies. Mr. Goldwater explained that when the strip was new the Navajos would hide behind bushes or stand off at a good distance and walk around the plane. Since then he has taken both school children and elderly Navajos for flights around the nearby peak where, according to native legend, the gods dwell. Now, if he doesn't make an occasional trip to the lodge, the Indians will plant corn on his airport.

Trader Bill Wilson's 25 years' experience in the Navajo country produced a wealth of "copy" about the near-starving Indians. The problem seems to boil down to insufficient funds voted by Washington to the Indian Service. The more than 55,000 Navajos really need the emergency aid that they are now beginning to get, but more permanent help can be given by reopening the many schools and hospitals that have been closed because of insufficient funds.

Of special interest to pilots is the distribution plan worked out by Ex-Hump pilot Derek Van Dyke and 20 ex-military pilots, members of the Air Force Associates in Phoenix. Barry Goldwater was one of them. Since many of the trading posts are nearly inaccessible to trucks during winter months, an "air lift" was planned to ferry essential food and medical supplies into these out-of-the-way spots.

We returned to the airport over one of the roughest dirt roads this side of China. It is easy to see why only 500 visitors a year travel to the lodge and take the 14-mile mule-back trip to the famed Rainbow Bridge, but here again, not enough federal funds makes it necessary for the lodge operators to do much of their own maintenance work.

We poured a single five-gallon can of gas into the *Navion*, since our next stop was to be Monument Valley, only 20 minutes away by plane. Our take-off from this short, high-altitude strip was made neatly, though the technique used by Mr. Goldwater may not be approved by the *Navion* designers. The throttle was opened wide with the brakes locked before the *Navion* began to roll. As the air speed picked up slowly to 50 mph, the pilot dropped the flaps. The plane literally jumped into the air as the hydraulic flaps reached maximum lift position. As soon as we were airborne, Mr. Goldwater snapped the landing gear lever. No effort was made to stop the action of the flaps and the plane picked up altitude quickly at minimum airspeed. The flaps were "milked" up slowly after a safe altitude was reached.

We saw a few wagon tracks in the snow, but no other sign of civilization in the short hop to Monument Valley. Near the trading post we circled the permanent Hollywood motion picture location of "Tombstone, Utah," an exact replica of Tombstone, Arizona, in the early days. This was the location for "My Darling Clementine" and other Western films.

Marked on all the maps, the Monument Valley Airport has been in use for over 16 years, but it is still a one-way strip. All landings are made uphill toward the towering red sandstone cliffs adjoining the 3,000-foot airstrip. Take-offs are made downhill. A pilot must land on his first pass into the field since there is no room to go around.

Owner Harry Goulding at Monument Valley has both gas and overnight lodgings for visitors. He reports enough air travel to warrant dragging a crosswind strip to his airport. The 80 Navajo families living near the trading post are having a rough time; 25 miles from the nearest of two schools (both full), 16 miles from water, and 100 miles (no ambulance) from the nearest hospital. Their main source of income is the infrequent motion pictures made in the area where they can earn $8 per day as extras, $10 with a horse and $18 with a wagon. But the "horse operas" are few and far between. Film, shot on this location, is rushed to Hollywood by chartered plane for processing.

With full tanks, the plane took most of the mile-high airport to get into the air, but once the gear came up, we climbed rapidly and headed back toward Phoenix. Twenty minutes later we passed over Kayenta, Arizona, with its small airport. There is a hospital there, but it was closed—no funds! Nearby is the El Capitan monument, a brilliant stone spire that is said to be higher than the Empire State Building.

For the visitor who plans a flying trip to the Navajo country, Mr. Goldwater jotted down from memory a partial list of available airports. "These fields are for high-performance lightplanes only, and landings should not be attempted with old, underpowered equipment. Cessnas, Luscombes, Stinsons and the Ryan *Navions* will get in and out of these if they are not too heavily loaded," said our pilot.

Airport	Approximate Length	Approximate Altitude feet above sea level
Cameron	4500 feet	4200
Many Farms	4000	4500
Marble Canyon ..	4000	4000
Window Rock ...	6000	6800
Tuba City	2000	4800
Shonto	2/3000 strips	6500
Rainbow Lodge ..	2000	6200
Kayenta	2500	5500
Chinle	4000	4500

Both Wide Ruins and Mexican Hat have strips, but their length and condition were not known.

These emergency strips were originally graded in 1938 under the direction of Cy Fryer, flying Superintendent of the Navajo Reservation. A proposal is now underway to build seventeen 7,000-foot dirt strips, at a cost of $1,500,000 to $2,000,000, for emergency use in case of epidemic, sickness or emergency food distribution throughout the reservation. The current proposal also includes flight instruction and aircraft for interested Indian Service personnel.

Flying back over the snow-covered mesa Mr. Goldwater pointed out how his *Navion* pays its way in his business. He and his brother Bob operate one department store and three shops in Phoenix and Prescott, Arizona. They make the 40-minute (3-hour by-car) trip at least once a week. During the war, Bob Goldwater was pilot of a CAP search plane that found a five-man hunting party lost in the Arizona mountains. He has over 1,200 hours as a pilot.

"All the executives at the stores are pilots. We have 14 men and two women who use this *Navion* and an AT-6 for business trips. Our auditor, our credit manager, our shoe buyer, the buyer of men's wear and his two assistants, the buyer of junior dresses, our advertising manager and our partner, William Saufley, are all licensed pilots.

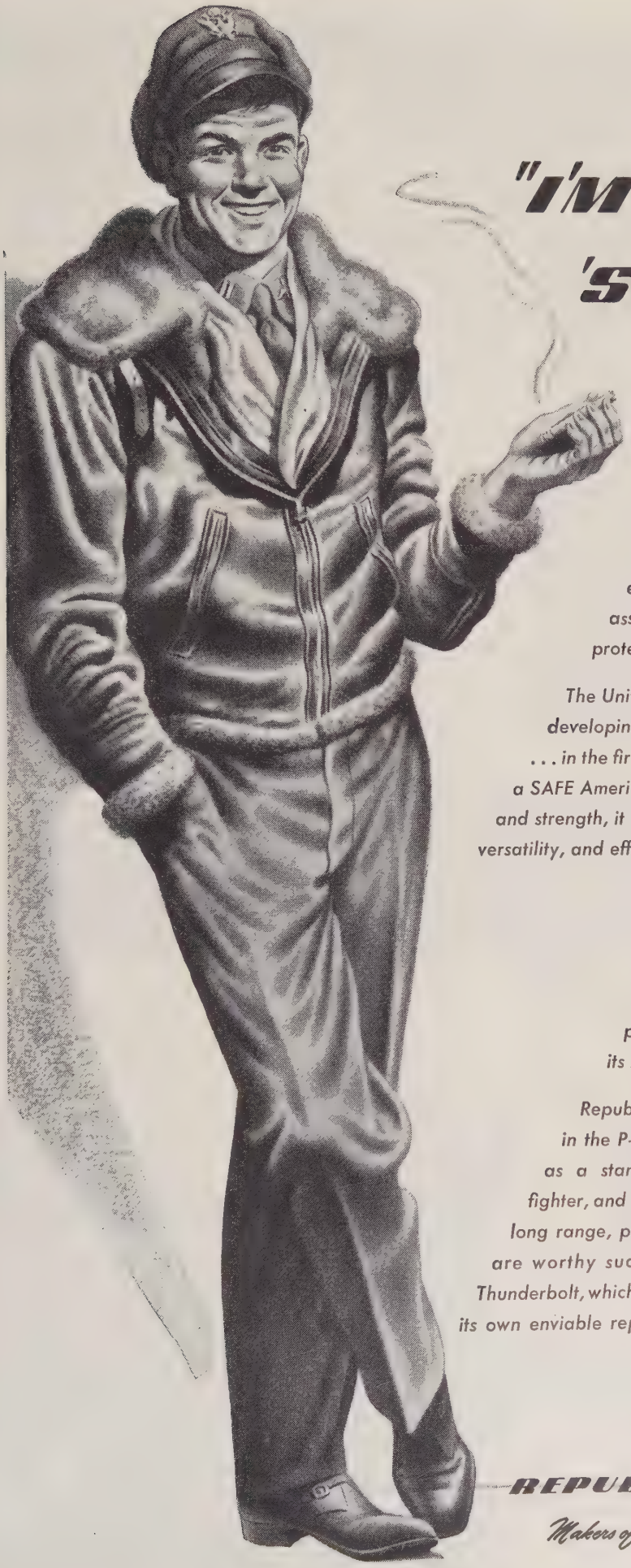
"We try to limit our trips to a radius of 1,000 miles. Anything over that makes the pilot-buyer too tired from flying and we use the airlines for trips beyond Dallas or San Francisco," said Mr. Goldwater.

Fashion shows are presented in nearby towns, Gila Bend, Ajo and Casa Blanca, by a pilot and three models who fly out from Phoenix. The time saved more than covers operating costs.

"We make frequent trips to Rainbow Lodge," explained our pilot, "to carry mail and perishable foods to the seven-man year-round crew, and ferry out-of-town visiting store executives to this scenic spot. The 14-hour drive from Phoenix is a man-killer, but the two-hour flight is just a breather before breakfast."

Until recently there was a flying club in connection with the Goldwater stores, but in almost no time at all practically all the interested employees had learned to fly. So the little trainer, too slow for the vast dis-

(*Continued on page 64*)



"I'M A 'SCIENTIST' NOW"

Remember the hot rock pilot of just a year or so ago? . . Well, luckily for all of us, this lad's still around. Today he's likely to be designated as project engineer and be flying research, or experimental planes . . . But whatever the assignment, he's still there . . . doing a job to protect our way of living.

The United States Air Force is alert . . . as ever developing new equipment, training personnel . . . in the firm belief that a STRONG America is a SAFE America . . . Despite a reduction in size and strength, it is making every effort to retain versatility, and effectiveness.

The aircraft industry too continues to serve its principal customers . . . the people of the United States . . . and the air services which guard their well-being, keeping under peace-time restrictions . . . an alert nucleus of its resources.

Republic's share of this responsibility is reflected in the P-84 Thunderjet, now going into service as a standard United States Air Force jet fighter, and the XF-12, four-engine, 450 M.P.H., long range, photo reconnaisance plane. They are worthy successors to the Mighty P-47 Thunderbolt, which in World War II established its own enviable reputation.

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Profit in Ownership

(Continued from page 29)

Fixed	*Per Year*
Depreciation	$1,091
Insurance	611
Hangar	311
Miscellaneous	90
Total Fixed per year	$2,053

If the depreciation figure seems large, remember that it is a means of writing off the capital investment over a period of 5½ years for tax purposes, and does not involve a cash outlay. The amount given for insurance is an average. Full-coverage on an airplane in the Stinson price-class (including all risks) would run about $860. Because that's quite a sum, a relatively small percentage of owners carry that much insurance. Omitting full flight, the balance of coverage amounts to something like $370.00 per year. The $611 average arrived at through analysis of the group of seven Stinson users is the result of several of the owners carrying that $860 full-coverage policy.

The Hangar item ($311) will vary with location and size of airport. The figure given is an average, allowing about $26 per month. These then are the Fixed costs, expenses that remain static . . . or fairly so . . . from year to year for the individual plane owner.

The Variables are the ones that slide up and down. If you are considering plane ownership, these are the costs you'll want to analyze in deciding the final value of aircraft ownership and operation. A point to remember before going into these estimates is that *the more a plane is flown a year, the less the operating cost either by hour or by mile.* (See chart page 28.) The more miles you fly a year in your plane, the more economical that travel becomes.

In showing the how's of that figuring, let's take a concrete example. The Premier Oil Refining Company of Longview, Texas, recently purchased two Stinson *Voyagers*. Both of these ships are in constant use by the company's six salesmen who fly all over the country contacting customers and delivering Premier Oil Company's products. In between sales and delivery tours, the ships are kept busy and general executive transports, ferrying company executives on regular trips between the Longview office and branch offices in Baird, Arp or Fort Worth, Texas, and Cotton Valley, Louisiana.

To show the cost of this operation for one of the Stinsons, consider the number of miles that plane may fly in a year. The distance between Longview and Baird or Fort Worth (and back) is roughly 700 miles. By car a trip like that, with time at either one or both destinations, could not be comfortably made in one day. By plane, however . . . and in the Stinson, that trip is a cinch, and with more time allotted on the ground, for the carrying on of business proper.

Having a cruising speed of 130 mph (and assuming the ground speed averages the same with a 10-mph headwind going out becoming 10-mph tailwind coming in over a route that is 350 miles each way), the trip can be made by plane in 5½ hours, as against 14 hours or more by car.

To sum up the yearly operating cost of that one Stinson, the average yearly utilization of the plane numbers 49,000 miles (or 545 hours flying time). With the Fixed cost of the ship set at $2,053 (see first table) and the variable costs per year, $2,250 (545 x $4.14), the total cost per mile of operating the Stinson is 9.6 cents per mile. Figuring it on a cost-per-seat mile basis (remembering the *Voyager* carries pilot and three passengers), it amounts to only 2.4 cents per mile. These figures are total operating cost figures. On most trips, the actual out-of-pocket expense (for fuel, oil, tie-down and minor maintenance) will be less than 1 cent per seat mile!

That makes operating a plane such as the *Voyager*, or any other four-place plane of similar performance and cost, about 40 per cent lower than airline travel, if only one person is in the Stinson, or still lower than that if two or more make the trip.

One factor that adds to the convenience of using a plane such as the Stinson in this kind of business flying is the fact that the company's golf course doubles in grass as a landing field, thus permitting the *Voyagers* to be taxied practically up to the steps of the Premier Oil Refining Company's building.

The really important reason, however, why Premier owns two airplanes is the matter of time: the lack of time between receipt of an order and its delivery, for example, or the short time it takes an executive to cover all three of the company's Texas offices. Saving time is saving money for the company . . . and it's making new friends and customers for them, too. It's a treat to put in an order one day and have it delivered sometime the next day instead of the next week . . . or month, and at a cost less than 3 cents a mile!

Weighing the extra business the salesmen get in traveling by personal, or in this case Company plane, and the time saved in travel against costs such as these, it is easy to see why more and more companies are buying such planes for the transport of executives, salesmen or cargo. The airplane is actually turning a profit for the company, and the whole traveling staff is a great deal happier and less harassed than they were before the airplane came into their daily life.

If there is still a question as to the practical use of an airplane, consider the case of Mr. E. A. Carson, of Evansville, Indiana. Mr. Carson flew several members of a contracting firm to Jackson, Mississippi, to Baton Rouge, Louisiana, back to Jackson and then home again to Evansville. The day after he returned from that trip, he received a check for $6,419, a sale that resulted from a trip that cost him only $27.50 out-of-pocket money for gas and oil!

Still another company that is making excellent use of a four-place plane is the Shannon Feed Company, of Tulsa, Oklahoma. Mr. L. D. Shannon operates seven feed stores that serve 73 of Oklahoma's 77 counties. The problem that dogged Mr. Shannon for years was how to get all the branch managers together for a meeting when they were all spread out at 70-mile intervals across the state. Getting the men to the meeting and back to their stores again took just too much time.

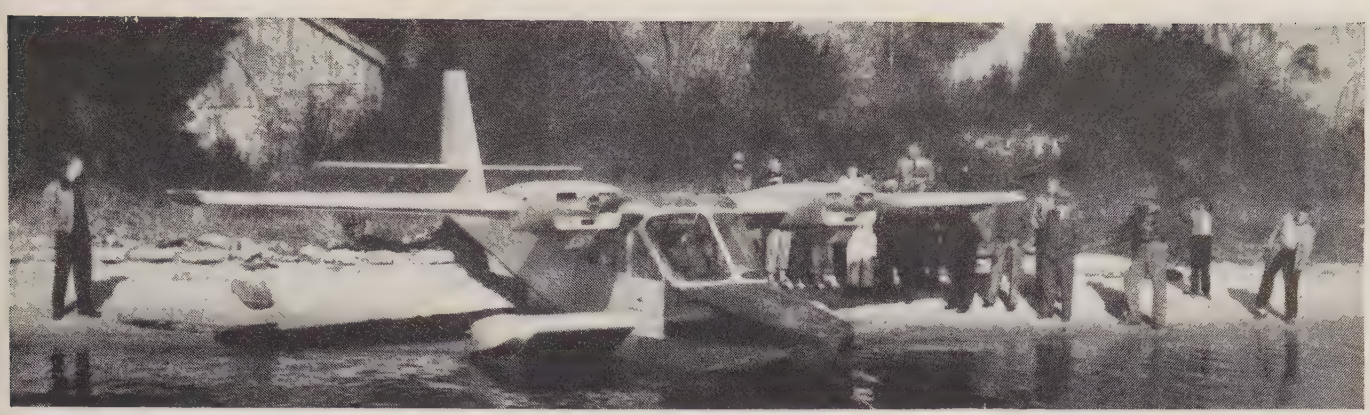
Mr. Shannon solved his problem by buying a plane . . . and he uses it for more than just getting store managers together. He also uses his ship to locate sources of supply that are off the beaten track. Not very long ago, Mr. Shannon flew to Colorado, Arizona and New Mexico and located a source of feed supply he hadn't even known existed. On the basis of his discovery on that single trip, he wrote out $100,000 worth of contracts.

In analyzing operating costs of his ship,

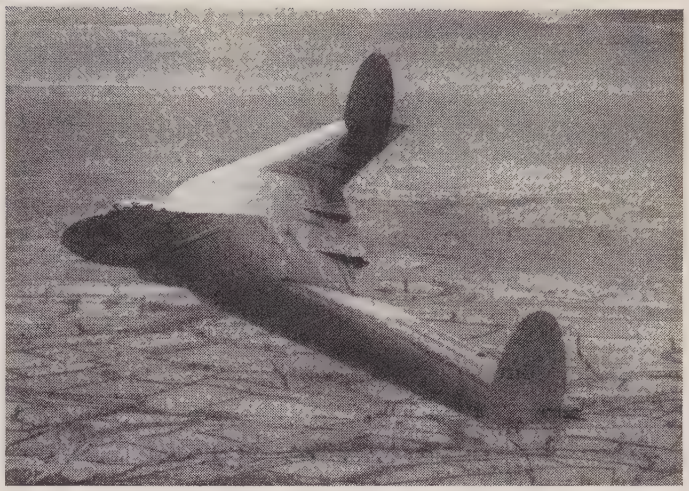
(Continued on page 54)

"There goes Ellsworth and his jet lawn mower!"

HUBAND



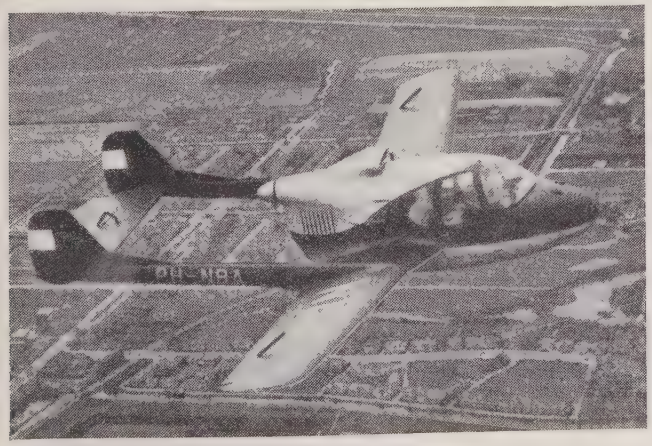
AQUA-FLIGHT amphibian, a new one designed and built by M. C. Wardle, in Wilmington, Delaware, is a four- or six-place ship. Powered by two 125-hp Lycoming engines, the amphib cruises at 118 mph, lands at 40 mph and has a six-place range of 400 miles, a four-place range of 800 miles. The amphibian has a gross weight of 3600-lbs.



ARMSTRONG WHITWORTH, well-known British aircraft company, recently began the flight-test program of its jet flying wing, AW-52. Powered by two Rolls Royce *Nene* turbojets, the AW-52 is reported to be in the "500-mph class." Ship has a pressurized cabin, ejector seats, thermal de-icing, 90-foot span, take-off weight of 33,000 lbs.

NEW... on the wing

FOKKER AIRCRAFT of the Netherlands is now test flying its dual-controlled primary trainer, the *Instructor.* Powered by 190-hp Lycoming engine, the Fokker S-11 has a cruising speed of 106 mph, a top speed of 134 mph, a range of over 300 miles and a service ceiling of 13,000 feet. The ships seat two side-by-side, but a third seat can be installed in the aft section of the cockpit. To date, more than 100 S-11's have been ordered by Dutch aero organizations.



FOKKER F. 25, called the *Promotor,* is now in full production at the Fokker factory in Netherlands. A luxury airplane, the *Promotor* is a four-place ship powered by 190-hp Lycoming engine. It has a cruising speed of 127 mph, range of 460 miles. Interior appointments include folding table, ash trays, and a glass and thermos flask cupboard. The baggage compartment is located under pilot's seat. Plane is all wood, except for metal tail booms and nose.

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Fixed vs. Variable

(Continued from page 34)

to over-speed. In level flight, the automatic propeller increases pitch, producing a higher cruising and top speed. In a dive, it will move to an even higher pitch so that the rated rpm of the engine is never exceeded. Since this pitch change takes place automatically and continuously, a virtually constant speed for a given throttle setting is registered on the tachometer.

Mechanical features of the automatic propeller have caused remarkably little perplexity. The absence of any controls in the cockpit, which is unusual for a controlling mechanism, is welcomed by most pilots. The number who want to fiddle with knobs and levers is definitely small. Perhaps this is fortunate for everyone because the correct propeller pitch could never be set as accurately by hand as by an automatic mechanism. To select the correct pitch for any given flight condition, a manifold pressure gauge and pitch indicator would be needed; two more gadgets to clutter the panel. The extra weight of the variable-pitch hub has been of no consequence because the extra horsepower variable-pitch operation makes available will carry a whole load of props.

The best antidote to any skepticism of variable-pitch propeller benefits can be found in the performance comparison* of variable- to fixed-pitch propellers on first-rate, well-known airplanes. The rugged and reliable Fairchild 24 makes a dandy example:

Powered by 175-hp *Ranger* or a 165-hp *Warner*, the Model 24 is a four-place ship capable of carrying 75 pounds of baggage, has an endurance of over five hours with a range of 620 miles. With the lower horsepower Warner, the first-minute rate of climb with a fixed-pitch propeller (corrected to sea level) is 640 feet per minute. Equipped with an Aeromatic propeller, the rate of climb is increased to 730 feet per minute, under exact conditions. This is an improvement of 14 per cent. The following table of fixed-pitch vs. Aeromatic performance under conditions of cruise at 1925 rpm tells the story:

Altitude	*Fixed-Pitch*	*Aeromatic*	*% Gain*
1,000	117 mph, I.A.S.	122 mph, I.A.S.	4.3
3,000	115 mph, I.A.S.	121 mph, I.A.S.	5.2
5,000	109 mph, I.A.S.	118 mph, I.A.S.	8.3
6,000	107 mph, I.A.S.	120 mph, I.A.S.	12.1

These benefits have extended the cruising range of the Model 24 and given it a shorter take-off run and higher rate of climb and a higher cruising and top speed. Its usefulness in short fields and bush country is greatly enhanced, and pilots are unanimously pleased with the smooth constant-speed operation of the Warner. The *Ranger*-equipped Model 24 uses 808 feet for take-off, but only 742 feet with the Aeromatic, an improvement of 8.2 per cent. The first-minute rate of climb is also improved 8.0 per cent from 497 feet per minute to 537.

The nimble little *Ercoupe* demonstrated that airplanes in the lower horsepower range also register gains with variable-pitch operation. Powered with a 75-hp Continental and loaded to a gross weight of 1,260 pounds, the first-minute rate of climb was upped from 660 with a fixed-pitch propeller to 800 with the Aeromatic, a 21.2 per cent improvement in climb. The following comparative cruise performance was determined with an engine speed of 2100 rpm:

Altitude	*Fixed-Pitch*	*Aeromatic*	*% Gain*
1,000	95 mph, I.A.S.	100 mph, I.A.S.	5.3
3,000	90 mph, I.A.S.	100 mph, I.A.S.	11.1
5,000	85 mph, I.A.S.	100 mph, I.A.S.	17.6

The *Ercoupe* demonstrates an additional feature of automatic propeller operation because it is so light. This is "rough air regulation," where the propeller holds the engine speed steady under conditions of rough air, which normally produces engine surging with a fixed-pitch propeller. The Aeromatic also increases the top speed of the *Ercoupe*, by 11.4 per cent, to 117 mph, I.A.S. at 2,000 feet altitude.

The recent *Ercoupe* flight made by Harry Newton from Antwerp, Belgium, to Auckland, New Zealand, furnished ample proof of the compatibility of a variable-pitch propeller and the *Ercoupe*. Mr. Newton wrote back that, but for the extra "jump" his Aeromatic provided, he would never have got out of some of the aboriginal fields where he stopped. Further, the large overload of gas he carried presented a take-off hazard wherever he stopped. But even with the extra gas capacity and take-off ability, Newton admitted that he wouldn't have had a chance on the long over-water stretches of the trip had he not been able to select a high-pitch, economical cruising speed. His flight established a long-distance record unequalled for a 75-hp single-engine monoplane.

The exceptionally popular, four-place Stinson *Voyager* powered by a 165-hp engine is another airplane which gets a big boost in behavior when fitted with a variable-pitch prop. The excellently soundproofed cabin of the *Voyager* makes detection of a slight change in propeller noise more noticeable than in a noisy airplane. This feature proves interesting when a fixed-pitch propeller is replaced with an Aeromatic. The variable-pitch propeller is noticeably quieter than the fixed-pitch prop because it assumes a higher pitch and thus reduces engine speed and propeller tip speed at cruising.

The following figures for rate of climb of the *Voyager* compares fixed- and variable-pitch operation with the airplane weighing 2,300 pounds, gross weight:

Altitude	*Fixed-Pitch*	*Aeromatic*	*% Gain*
Sea Level	590 fpm	745 fpm	26.1
1,000	550 fpm	678 fpm	23.2
3,000	465 fpm	545 fpm	17.1
5,000	380 fpm	415 fpm	9.2

The 100-hp, three-place Piper *Super Cruiser* exemplifies the advantages of variable-pitch for its class of airplanes, from take-off run to top speed. With a fixed-pitch propeller, the *Cruiser* takes up 720 feet of runway on take-off; while with the Aeromatic, the take-off run is reduced to 540 feet, a decrease of 25 per cent. Due to the widespread use of the *Super Cruiser* in and out of short fields, a great number of variable-pitch propellers

** All comparison figures used in this article were obtained in CAA approval tests, but will vary with individual planes.*

have been put on *Cruisers* by operators who report that they can handle the *Cruiser* with a load almost as they can a *Cub* without a load, as far as take-off run is concerned. Also, take-offs from sandy or loamy second-rate fields are greatly improved by the higher power available with low pitch.

The first-minute rate of climb of the *Super Cruiser* with a fixed-pitch propeller is 600 feet, while with the Aeromatic it is 882, or an improvement of 47 per cent. This substantial gain in performance, while not confined to the *Cruiser*, indicates that certain aircraft due to their wing loading or general aerodynamic characteristics derive unusual gains form variable-pitch performance. Generally, the highest gains are registered in the more critical take-off and climb where the fixed-pitch propeller restricts power to the greatest extent. Increasing engine speed to rated takes advantage of the characteristic of a gas engine that it will not develop full power except near its top rpm. Top flight-speed gains are not always as spectacular as take-off and climb figures with a variable-pitch propeller because the variable-pitch propeller cannot do more than develop full engine power, a function possible with the fixed-pitch propeller at full throttle and high flight speed. The top speed of the *Super Cruiser*, however, is increased from 115 mph to 110 mph, an improvement of 3.4 per cent; and the cruise is upped from 105 mph with the fixed-pitch propeller to 111 mph with the Aeromatic or a gain of 5.6 per cent.

The *Super Cruiser* with Edo floats, or *Super Sea Scout*, chalks up a magnificent take-off improvement with variable-pitch. The extraordinary drag of the floats in water, combined with a fixed-pitch propeller, keeps the *Sea Scout* on the water for a 55-second take-off run. With the Aeromatic, under identical conditions, the *Scout* breaks free with a 28-second run, an improvement of 49 per cent. The first-minute rate of climb of the *Scout* is improved from 334 feet to 415 feet with the Aeromatic, or an improvement of 24 per cent.

The aerodynamically clean, four-place, 150-hp Bellanca provides a study in the need for variable pitch on high-performance aircraft. The take-off run of the *Cruisair* with a fixed-pitch propeller is 957 feet, a figure which is reduced to 485 feet with an Aeromatic propeller, or an improvement of 49.4 per cent. Cruising performance of the *Cruisair* with a fixed-pitch propeller turning at 2435 rpm, is 133 mph. The same airplane turning an Aeromatic at 2350 rpm registers 152 mph, an improvement of 14 per cent. Top-speed performance of the *Cruisair* with a fixed-pitch propeller is 146 mph at 2700 rpm, but with the Aeromatic it is increased to 164 mph at 2600 rpm, an improvement of 12 per cent. The wide discrepancies in the behavior of the *Cruisair* with a fixed-pitch versus a variable-pitch propeller illustrates that higher powered, aerodynamically efficient airplanes generally benefit from a variable-pitch propeller to a greater extent (or are more restricted by fixed pitch) than smaller aircraft of less power. Larger, higher powered aircraft, of 185-hp and up, are often hazardous without variable-pitch propellers and are certainly short-changed on versatility when they are fitted with fixed-pitch propellers which extend their take-off run to a distance almost as great as the length of some fields.

The high take-off and climb performance of the trim, all-metal *Swift* 125 is principally due to its variable-pitch propeller, as is its exceptional range of speed from stalling to a top speed of 150 mph. With a fixed-pitch propeller, the top speed is limited to a maximum of 142 mph, so the improvement with the Aeromatic amounts to 6 per cent. The Aeromatic also increased the first-minute rate of climb from 693 feet, with fixed pitch, to 975 feet, or an improvement of 40.8 per cent. The outstanding cruise performance of the *Swift* at 144.7 mph with the Aeromatic is a substantial 9.6 per cent improvement over the 132 mph of the fixed-pitch propeller.

(Continued on page 60)

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Profit in Ownership

(Continued from page 50)

Mr. Shannon found that it completely paid for itself in six months and is now adding to his profits.

Another user is the J. T. Sinclair Company, of Detroit, Michigan. J. T. Sinclair, Jr., reported that without their plane his company couldn't have made half the calls in other cities that they are now making.

The Sinclair ship makes routine trips to Chicago, Pittsburgh, Columbus, and to various cities in West Virginia. Not bound by time-tables, the Sinclair men leave Detroit when they are ready to go, and leave to fly home when they've finished their business. Not having to wait around for either train or plane schedules saves plenty of time. Getting as much mileage as they do out of their ship, the Sinclair Company finds that operating costs are very low . . . so low as to make other forms of transportation impractical.

Favorite user of a plane for both business and pleasure is H. R. Wood, of Grady, Arkansas. In addition to running a general store in Grady, Mr. Wood owns 5,000 acres of cotton fields, and 500 head of cattle on pasture land. More than that, he's the village banker. Still Mr. Wood had time to learn to fly at an age when most men think of retiring, and he flies his ship to Memphis to buy things for his store, to St. Louis for purchases, and he uses it to check his acreage and his cattle. According to Mr. Wood, "I can't afford *not* to fly!"

Such statements by actual users of planes like the Stinson *Voyager* and *Flying Station Wagon* must be true. Constant operation of their planes has proved it, for their estimates were arrived at from actual use and not from day-dream compilations of unknowns.

While flying is still not as inexpensive as the aircraft companies would like it to be, it is a practical and profitable means of transportation for those companies, large and small, that must cover vast territories in the furtherance of their business. Proof of the fact is the ever-increasing list of companies and individuals that own aircraft and get the use from them that the aircraft builders intended . . . and all at a below-par cost. Less than 1 cent a seat mile is below par on any course of transportation.

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Cockpit Meteorology

(Continued from page 25)

fog about 50 days of the year. The greatest concern, therefore, on the part of the contact pilot must be shown when he's flying in every section of the United States *not excepting* that Northwest and Southwest section that includes Montana and Texas. Being ever alert to possible fog conditions, the private pilot will not be caught by the grey stuff.

Aware of the possibility of morning fog along the East Coast, for example, the private pilot will not schedule his arrival at a coastal airport early in the morning. If he's a smart pilot, he'll give himself the benefit of the doubt and won't plan to arrive at his coastal destination until late morning or early afternoon, thus giving the fog a chance to be burned off by the sun. This, of course, *if* overcast is not predicted for that specific area.

Rather recently a pilot ignored the prevalence of fog along the coast, and he left Canada at such a time as to make his ETA at Boston around 6 o'clock in the morning. Even though a flyer with many hundreds of hours, he completely overlooked the possibility of fog. As a result when he came into the Boston area, it was closed in and in trying to make a blind approach to the airport, he crashed into an oil tank, killing himself and his three passengers. Had that pilot heeded the signs on the weather map or translated the teletype reports which were available to him at the Canadian airport, he would have either cancelled the flight or he would have chosen as his destination an airport several miles inland, one that was completely free of fog. Not only did this late pilot give little if any thought to the possibility of fog but he ignored the fact that there was an overcast covering practically all of that section of the country, thus precluding any possibility that morning sun would burn off the Boston fog by 10 or 11 o'clock let alone 6 a.m.

Having a thorough knowledge and awareness of fog, the pilot should always choose his destination with care and allow himself an alternate airport which he can use in case . . . For example, if he's planning a night flight in an area where the factors of fog are favorable, he should plan his flight so that he arrives after sun-up and preferably at an airport on high ground. Airports on high ground or hill tops are the last to be fogged in and the first to burn off in case of ground fog. If, however, when the pilot arrives at the field he finds it still closed in, he should immediately fly to his already picked alternate field. Fool-hardy is the pilot who lingers over the field hoping the fog will burn away before he runs out of gas!

But in any case, wherever chances of fog show up on a weather map, the pilot should either cancel his flight or be certain to pick himself an alternate field he's sure is outside the fog zone . . . and carry more than enough gas to get there. This calls for good flight-planning *before* the take-off, not after.

Remember—you are warned of the possibility of fog when temperature and dew point are within a few degrees of each other; watch for fog along the sea coast when the wind is off the water; there'll probably be fog where there's a wide precipitation area; in the fall and spring be on the alert for fog if the airport lies near a large lake or river; look out for fog if the air is moving up-slope. These aids are tested and true. Remember them and enjoy really safe cross-countries.

Thunderstorms, the second of the three top hazards, present a different problem entirely and are oftentimes a challenge to your quickest thinking. It's easy to run into thunderstorms in your flying, thunderstorms that often are unpredicted. And that's where real practice at cockpit meteorology becomes invaluable.

By keeping a close watch on those clouds up ahead, their size and shapes, you'll learn a lot and can be forewarned.

If the clouds are flat Cumulus ones, there's little cause for worry. Usually they have no vertical currents at all and offer favorable flying conditions. Flying is smoothest above them and, unless there is icing, there is little that's disturbing about them.

However, if those Cumulus clouds build up and become towering white masses with a tendency to "smoke" out the top, they're forerunners of a thunderstorm! They mean severe vertical currents . . . and something to keep out of and away from. Snow or rain does not fall from this kind of a cloud, but you are likely to run into icing if you try to go through it. Fly around it . . . not into it. Circumnavigating this cloud takes only a short time and you will be saving your ship (and yourself) from damage.

(Continued on page 56)

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TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD

Cockpit Meteorology

(Continued from page 55)

Never try to fly through a thunderstorm. Your chances are better walking through a spinning prop. The violent currents within the confines of a thunderhead are strong enough to tear a lightplane apart—as though it were made of matchsticks. Breathtaking up-drafts that are immediately followed by slamming down-drafts have been known to pull wings off a plane and completely disintegrate it within a few minutes. There is no such thing as a lightplane under control once it charges into a thunderstorm. It's a lightplane entirely at the mercy of the maelstrom of winds that whirl and swirl at unbelievable velocities. So keep out of thunder storms . . . and far out!

If in the course of your cross-country, you spot a thunderhead in your flight path, change your course and fly around it. And do not skirt the edges as you go around. Some of the most severe turbulence in a thunderstorm exists at its edges. Therefore, always alter your course so that you clear it by plenty, and always keep blue sky or at least high overcast above you.

Should you decide that the storm is approaching so rapidly you can't circumnavigate it, pull around as fast as you can and high-tail it for the closest airport. Get down on the ground before the heavy winds that roll in advance of such a storm get there. And stay there until it's all over.

Here are a few rules to live by in this matter of thunderstorm navigation.

1. (and the best) Land and wait for that area to be clear of thunderstorm activity.

2. If it's a case of cold-front thunderstorms consisting of individual thunderheads separated by clear regions, it is sometimes possible to fly through the open areas between the clouds and above the lower cloud masses. If you decide to try this, however, be sure you fly no closer to the domes of the thunderheads than 2,500 feet.

3. Never skirt a thunderstorm beneath an intermediate level overcast. Hold your course under the blue sky or high overcast. Heavy hail and rain can exist around the edges and in advance of the squall cloud, and severe turbulence is likely to be encountered.

4. Rather you play Russian Roulette than endeavor to fly through the highly charged greenish-hued areas in a thunderstorm. Turbulence in those regions is not only violent but it is also accompanied by hail. Hail stones have been known to pierce the fabric covering on lightplanes.

5. Don't try to fly underneath a cold-front line squall or prefrontal thunderstorm. If you're caught in a squall and can't land because of the wind shifts, your only alternative is to (a) pick out a thin spot and fly through; (b) try to go over a saddleback; or (c) fly through the squall at a 90-degree angle to the line of the storm.

In the matter of icing, third on our list of hazards, there are two basic requirements for its formation on your plane. You must be flying through visible water in the form of rain or cloud, and the temperature of the water drops must be 32 degrees or below when they hit the plane. Heaviest icing on aircraft usually occurs between 15 and 32 degrees F. Icing will not be one of your worries, however, if the air is clear, relative humidity is high and temperature is near 32.

To the contact pilot the most probable type of icing is that which is the result of flying through freezing rain. The best assurance, therefore, against icing conditions and the dangers thereof is to stay on the ground when the temperature is below 40 degrees and if weather is overcast, with a prediction of rain.

Should you have an X-C scheduled, the flight course of which includes an area (no matter how small) where there is the possibility of rain and low temperatures, play it safe and either by-pass that "storm" region or take another route entirely, one that will bring you nowhere near the "border-line area." In by-passing such a portion of possible freezing rain, remember always that the storm is moving, too, and see to it that you by-pass it with plenty of margin.

Should you run into an icing condition in flight, turn back . . . and quickly . . . to the nearest airport. In only five minutes you can pick up enough ice to put your ship out of control. When you reach the airport, land power-on and keep airspeed above your normal landing speed. Thus if ice has formed on your wings (which will increase your stalling speed), you'll be flying with at least some margin of safety. Remember, too, to avoid turns at low altitude. Keep your controls moving slightly so as to keep them from freezing up on you, and have a side window opened a little to keep frost from forming on the windshield.

The CAA Bulletin, *Meteorology for Pilots*, includes a list of flight "Don'ts" for greater safety under icing conditions. We're going to repeat them here.

1. Don't continue a flight into regions of known icing conditions.
2. Don't fly through rain showers or wet snow when temperature at flight level is near freezing.
3. Don't fly parallel to a front under icing conditions.
4. Don't fly into clouds at low altitude above crests of ridges or mountains.
5. Don't fly into cumulus clouds at low temperatures.
6. Don't make steep turns with ice on a plane.
7. Don't practice stalls or spins with ice on an airplane.
8. Don't land with power off if you think ice may have formed on wings or exposed surfaces of plane.
9. Don't try to climb too fast when ice has formed on your plane.
10. Don't forget when flying under icing conditions that gasoline consumption is greater, due to increased drag and the additional power required.
11. Don't attempt a cross-country flight in fall or winter without first consulting the nearest United States Weather Bureau Airway Forecast Center to get a forecast as to expected icing conditions.

That last "Don't" is a good one to follow under *all* cross-country flight conditions. Always contact the nearest Weather Bureau Airway Forecast Center and get the latest dope on *all* weather conditions in the vicinity of your destination and along the airway you plan to follow. If that weather station isn't within a 10-cent phone call of you, go ahead and spend the extra money it'll cost to contact them on the phone. Better you spend a dollar and enjoy tomorrow than pinch the dollar and be where you won't ever need a dollar again.

"Rat-a-tat-tat—take that—and that—ha—I got ya—rat-a-tat-tat-tat!"

LAMB

Tony LeVier . . . Test Pilot

(Continued from page 23)

Navy *Venturas*, airline *Constellations*, Army *Shooting Stars*, and the new 180-passenger *Constitution* on first flights. It was from an early, pre-production test model of the P-80 jet fighter that he took his only mid-air leave. He describes it this way:

"I was flying at 10,000 feet over the desert near Muroc, doing 550 mph, and had the turbine engine turning at the then top 11,500 rpm, compiling level-flight data. Suddenly, I noticed a slight vibration, then the nose dropped and the plane began tumbling violently."

Right there the typical motion picture test pilot would be shown, in a close-up, doing and saying heroic things. Tony's reactions didn't conform.

"All I could think of was: 'I've got to get the h..... out of this plane, but quick.' I was tossed around so, I had some difficulty getting hold of the canopy release, but finally made it and the canopy flew off. Then, after several tries, I managed to release the safety harness latch. The next thing I knew the plane, minus the empennage and fuselage back of the trailing edge of the wing, and I were tumbling through space, about 50 feet apart."

He doesn't know whether he was thrown or sucked out, and was so relieved at being free of the crazily gyrating plane he forgot to open his parachute, and fell three or four thousand feet before he realized it.

"That's all there was to it," Tony concluded. "I opened the 'chute and came down OK, but when I hit that hard, desert ground it cracked me up a bit."

At this point Tony's experience again varies from the movie norm. The girl came to visit him in the hospital, of course, but she brought along their six-month-old daughter, Toniann, too. And "The Boss" didn't come to thank him for saving the factory from bankruptcy, either. Lockheed's finances were safe and sound, and Engineering V.P. Hall Hibbard just wanted to make certain that Tony was okay.

He went away assured and with a report on what went wrong. A defective turbine wheel had disintegrated and cut the fuselage in half, just ahead of the engine compartment. No fault of the airframe itself. And that brings up Tony's chief gripes.

"A piece of purchased equipment goes wrong—something the airframe manufacturer buys, sometimes under order from those for whom the plane is being designed and built. Down comes a plane and up go the headlines. A named plane crashes because of failure of an engine or some other part made by an unnamed manufacturer, but the airplane gets all of the bad publicity."

Tony believes that in the long run the entire industry shares the injury and that it could avoid much of it if it worked together better.

"To progress we all have to experiment, that is understood. But, why be secretive about it with each other?" Tony asks. "Design engineers know wherein they are experimenting. If they would frankly warn us at which point their new equipment—whatever it is—will likely be undergoing stress that may be beyond proved endurance, we test pilots would be braced for possible trouble. Being aware of potential failure would help us to avoid it."

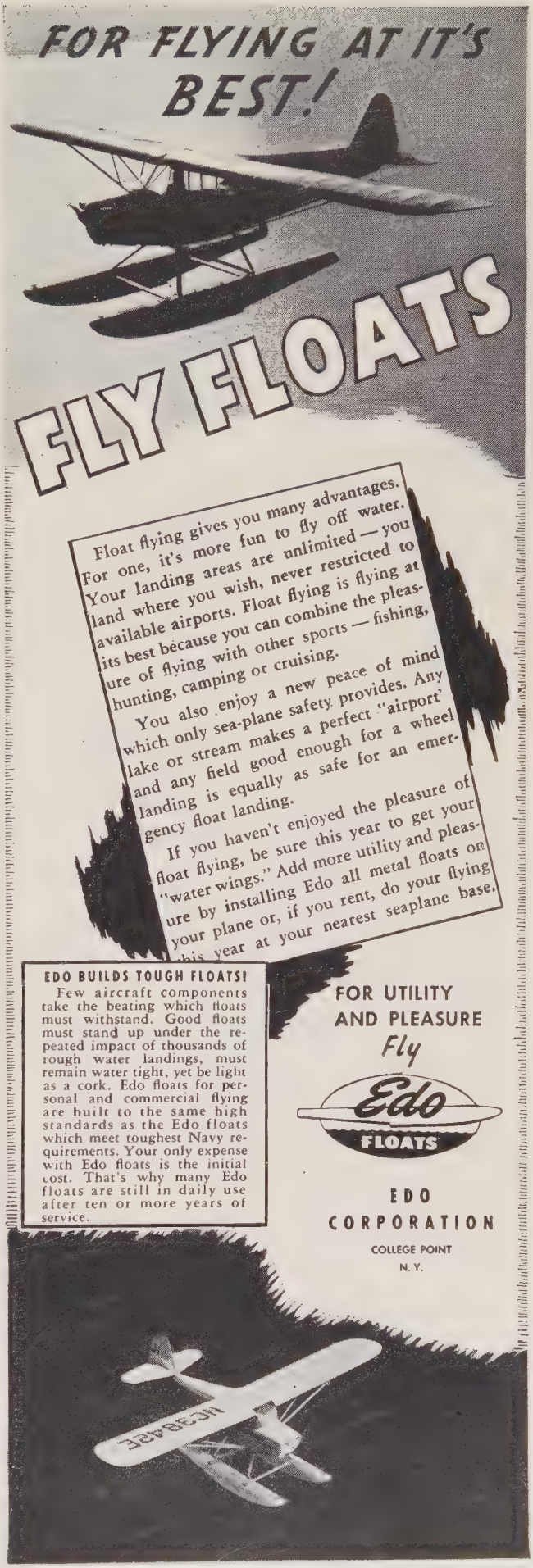
He also believes there is too much interference in aircraft design and testing on the part of those for whom new designs are being created. And he doesn't mean the sort of thing the villain in a movie attempts to do but is foiled just in time for the happy ending.

"Some of this kibitzing is done by nice fellows who want to be helpful, but who just can't be expected to know everything a design engineer knows. A lot of engineering know-how never shows up on the blueprints, or in the airplane."

He cites the P-38 as an example. As it neared the speed of sound its flight characteristics seemed to go haywire, sometimes with tragic result, Lockheed engineers attributed it to what has since become known as the effects of "compressibility," a new term back in 1940.

"If the army had taken our engineers' word for it and said, in effect, 'it's your problem, solve it,' a lot of time and money would have been saved. Instead, our boys had to design, build and test a number of different tail assemblies to prove what Lockheed engineers already knew—that the tail was not to blame, that there is this transition strata now familiarly known as com-

(Continued on page 58)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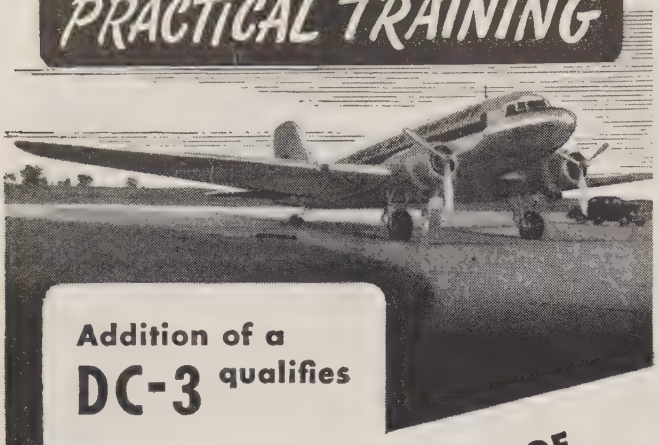

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Tony LeVier . . . Test Pilot

(Continued from page 57)

pressibility area. In that area things happen we still do not fully understand."

Tony believes that faster progress will be made if original, basic research is carried on co-operatively, as it is today, but the user of such data be permitted a freer hand in its adaption to his particular use.

"The *Flying Fortress* bomber and P-38 fighter, our two most useful combat planes at the start of World War II, illustrate this point. In both instances an outstanding new idea in combat aircraft resulted from expensive gambles, on acceptance of the then quite new interpretations of bid specifications. Fortunately, both of those gambles were won. However, some others were not . . . and were costly.

"If, on the other hand, new design contracts clearly left it up to the contractor to provide a specified minimum performance, regardless of how, we'd get there faster. In fact, we would have had the P-80 a year or two sooner. Our engineers had the jet-propulsion idea quite a while before specifications came along to which it could be applied."

Tony LeVier fails to follow the movie test pilot pattern when he is off duty, too. Instead of sipping frosty tall ones on a swank club terrace, he prefers hunting, hiking, swimming, skiing, and flying his personal planes.

One of those planes is, of course, a war surplus P-38. He stripped it down, cleaned it up, and in it he won second place in the 1946 Thompson Trophy race at the National Air Races, and fifth in the same dash in 1947.

Tony got the racing bug in 1932, while barnstorming as co-pilot of a Ford *Tri-Motor,* and later as pilot of a Curtiss-Wright trainer he bought, and its successor in his airplane "stable," a Great Lakes.

When carrying passengers at $1 per, taking off and landing on hillsides in Pennsylvania, bored him, as it inevitably did, his thoughts would turn to what seemed a much more interesting form of flying—racing—and it still holds that appeal for him.

It took five years of dreaming, scheming and saving before he finally flew in an air race. Four years after he first got the bug, he bought his first "racing" plane, a cracked-up Brown *Special.* However, the National meet was over before he could get it in shape. Then he bought a midget-size racer that had never flown, and it cracked up at the end of its maiden trip into the blue.

He got his first good break in 1938 when William Schoenfeldt let him fly the then "fastest airplane in the world," the famous Keith Rider "Firecracker." In it he won the Pacific International Air Race at Oakland, Calif., and the Greve Trophy event at the National Air Races in Cleveland.

Bad luck continued to dog him, however, and a weak landing gear damaged the "Firecracker" as he landed after winning the Greve race, thus preventing his entry into other events that year. In 1939 he again led in the Greve dash until his engine failed. Landing safely, the trouble was corrected, and he went on to place second in the Thompson Trophy event.

Tony was a popular contestant at the 1947 National Air Races, and placed fifth in the gruelling Thompson race, won the Sohio special P-38 event, and came in fourth in a new addition to the big race, a slow motion affair for midget planes that seemed to zip around the course like water bugs on a millpond.

Midget racing planes claim part of his spare time. He designed and built the midget to compete with other members of the Racing Pilot's Association who built their own racers. Rather like an air version of midget auto racing.

His midget, derisively named "Cosmic Wind" by Tony, is a junior-size monoplane with an 85-hp Continental engine. Since its debut at the Cleveland meet, it is undergoing redesign in an effort to step up its speed.

The "Cosmic Wind" is one of five similarly powered baby racers Tony and four of his Racing Pilot friends are now polishing up. In them they expect to bring air racing to places where larger planes could not operate, i.e., state fairs, etc.

"We won't be flying very fast," Tony explains, "but being close to the crowds, and over a small, closed course, it will just seem fast. In this way we can do our part in building up interest in aviation in places and among people who otherwise would never get the thrills air race crowds experience. Maybe that will create more of an understanding of the importance of

(Continued on page 64)

Dilbert

(*Continued from page* 31)

now he had such a thing . . . the lug!

Anyone with his flight experience, however, must have known about his carburetor ir control and fuel-tank selector valve. But e didn't use these either. His engine failure as caused by carburetor icing or fuel exaustion; due to the weather conditions and e length of time he had been flying on one nk, either might have been responsible for s dunking.

There it is! What at first glance looks like pretty fair exhibition of emergency reacon, starts smelling the minute you stir it. ranted this dodo handled his flight controls ry well, but he didn't know his safety conols from a hole in the ground.

Which causes me to sound off again on ne of my pet themes, "mental emergency rills." Place yourself in every sort of preicament you can possibly imagine. Then figre out the correct safety procedure—and entally, at least, carry it out. Only by such lf-imposed drills will you be *prepared* to act promptly and correctly when emergencies actually occur.

nverted Spins—The other day while racticing acrobatics, Dilbert inadvertently ent into a spin from the top of a loop. Forunately, he was at 5,000 feet at the time. I ay "fortunately" because he couldn't stop ne rotation. He was still whipping around at ,500 feet when he decided it was time to ump. This was a potent idea, but he never id get to execute it. The moment he released is safety belt, he *fell* out.

The fact that he started to spin while he as on his back at the top of a loop, that he ouldn't stop the rotation, and that he was till on his back when he started to jump; ll indicate this was an inverted spin. Dilert later admitted that some such notion itted through his head at the time, but it as just a hazy idea and he didn't have time nough to figure it out. He wasn't prepared!

Many a good airplane has been washed ut like this. The sad part of it is that the ilots often think something went wrong ith the plane, instead of with themselves. hese poor guys are just as vulnerable the econd time.

Not all acrobatic courses include inverted pins, nor are all planes designed to withand the stress of this maneuver. However, nce it is relatively easy to fall into an inerted spin from the top of a loop, it should e a *must* for every aviator to recognize one nd know the recovery technique for this ind of a spin—or any other.

If you go into an inverted spin with power n, it is apt to develop so rapidly as to be onfusing. The sensation of being thrown way from the controls is your best indicaon that the spin is inverted. As you can nagine, a loose safety belt doesn't add to our security in this position. Besides, you eed *full* throw of rudder and stick to ecover.

Recovery procedure is simple and closely arallels that for a normal spin:

a. Cut the gun.

b. Kick hard opposite rudder, to stop roation. This is where most of the mistakes re made. If you look down at the ground rom an inverted position, you get an illusion of reverse rotation. This makes you kick rudder the wrong way and merely tightens the spin; which is what Dilbert did. To determine direction of rotation, look along the nose of your plane, or refer to your turn indicator. Either way will indicate true direction of rotation in both normal and inverted spins.

"Sign of an inverted spin is a try at making a two-way stretch of your belt"

c. Neutralize the ailerons and pull the stick all the way back—since you are on your back, this makes you dive.

d. As soon as rotation stops, finish recovery by rolling out, or completing the loop, or by a combination of both. In this connection, it is well to know that you lose less altitude by rolling out.

e. Ease your throttle on very gradually—you probably have lost oil pressure.

Please, if you want to pay on your insurance and not have your family collecting it, don't go and try this out, except under competent instruction, and in a plane designed to take it. That whole statement ought to be repeated for emphasis . . . it's d..ned important. The spin is rapid and some planes don't come out of it too easily. You can depend on it, a plane which is hard to spin usually is hard to bring out of a spin. None of which is any excuse why you shouldn't know what an inverted spin is all about.

Remember to watch that nose to determine direction of rotation!

According to Confucius—One good scare worth more to bird-man than thousand lectures.

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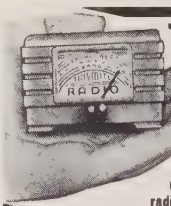

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See page 60

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Fixed vs. Variable

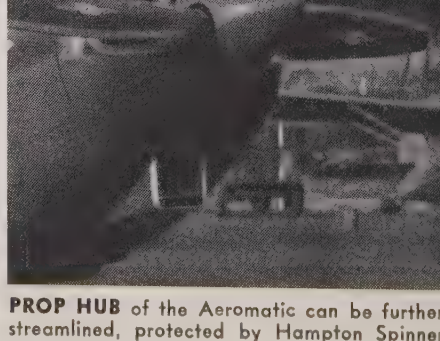
(Continued from page 53)

All of the aircraft used for examples, and many other types, have produced tangible proof of the superiority of the variable-pitch propeller over the fixed at every stage of flight. However, this is not enough for some pilots who are relatively well satisfied with their planes and will only buy a variable-pitch propeller if its over-all advantages offset and justify its extra expense. This is an understandable view considering the $300 or more cost of a good variable-pitch propeller.

Versatility, or small-field utility, is often a major sales factor with several prominent makes of aircraft. In this same category comes the ability to use floats and skis and operate out of snowy, sandy, or loamy fields. Gas consumption can be reduced with higher wing loadings and the selection of more economical cruising speeds. Cruising range may be extended appreciably. The flexibility of the variable-pitch propeller also presents a saving if an airplane is to be used at a high-altitude field, a situation which often calls for the purchase of another, lower pitch, fixed propeller. By adjustments, the variable-pitch propeller will restore lost rpm at altitude in addition to maintaining a much safer take-off margin than the fixed propeller. Particular flyers, who often have several different fixed-pitch propellers, no longer need a variety. Also, they no longer need to throw the propeller away when they damage or break a blade. The variable-pitch propeller always has individually detachable blades.

In the technical department, it has been demonstrated that excessive cylinder-head temperatures and pressures generated by the over-load or over-speed of a fixed-pitch propeller do not occur with the variable-pitch unit. Constant speed and constant power output of the engine reduces wear and extends periods between overhaul in addition to effecting a saving in gas and oil consumption. Since most variable-pitch propeller blades are of plastic-covered wood or composition construction rather than metal, nose overs do not damage the engine because the blades snap off, usually without even damaging the propeller hub mechanism.

In the final analysis, technical features and indirect benefits of a variable-pitch propeller assume secondary importance to most pilots after one flight with a variable-pitch propeller on their own airplanes. They are generally so delighted with the new pep in the old ship that the first thing they want is a race instead of a lecture on judgment.



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Navajo Navion

(*Continued from page 48*)

tances covered in Arizona, was finally sold.

The history of Arizona is a hobby with Mr. Goldwater. He gives many lectures to clubs throughout the state and uses his plane for both transportation to lectures and in gathering information. Many private pilots have difficulty in meeting precise, time-table appointments via lightplane because of weather delays. That's not so with Mr. Goldwater.

"The flying weather in Arizona is usually excellent," he explained. "Summer thundershowers build up in the late afternoon, but you can wind your way around them. Occasional spring high winds and winter snow storms can be avoided by a call to the Weather Bureau before take-off."

The instrument panel of Mr. Goldwater's *Navion* is not, however, that of a fair-weather pilot. He has a complete blind-flight group including artificial horizon, gyro compass, rate-of-climb and vacuum pump scavenged from a surplus BT. In addition to a two-way radio, he has a VHF transmitter, a marker beacon receiver, and fluorescent lights. He has made a number of night instrument let-downs into the Los Angeles area. The only concession made to night flight in this busy single-engined ship is the addition of parachutes.

Mr. Goldwater is not only a good pilot but also a good business man. Typical of his stores is the original idea for "Antsy pants," white shorts on which has been printed large red ants. The shorts were made exclusively for the Goldwater stores by a Los Angeles firm, and when transportation bogged down, were flown to Phoenix and Prescott by the *Navion*. During the course of this trip, Mr. Goldwater showed a letter of thanks from the White House in Washington for a gift of a pair of "Antsy pants."

Amid the Kachina Indian ceremonial dolls, heavy framed pictures of the founders of Goldwater's, and formidable-looking business charts in Barry Goldwater's business office was a small, ragged pasteboard box with a circle drawn on it. This was propped up on a chair.

When the executive noticed my quizzical glance, he explained with a grin, "I'm having a little trouble getting my air pistol sighted in!" If he's as good at that as he is at flying, he's a real sharpshooter.

Tony LeVier...Test Pilot

(*Continued from page 58*)

costly and continuing search for more and more speed in aircraft, both militarily and commercially."

As a gesture to his moving picture counterpart, Tony sometimes concludes an exhibition with his P-38 by making a dead-stick landing with such precision his plane rolls to a stop facing a grandstand crowd and neatly executes a curtsy. As Tony applies the brakes sharply, the nosewheel absorber depresses and permits the plane's nose to dip and recover in a stately bow.

Like movie test pilots, Tony takes new models aloft to prove something that will enable the engineers to eliminate "bugs," and improve performance and safety. Unlike movie pilots, however, who come down with preconceived opinions confirmed via "the seat of the pants tests," he brings his findings back to the builders in undramatic engineering form—on check-lists, graphs from sensitive recorders, and film from cameras which take hundreds of pictures throughout the test period.

Tony's test flights, like those of others of his profession, have an unerring way of paying off, not at the box-office, but in knowledge of possibly more importance to the vital interests of 140 million Americans. At a not too distant date, what he is proving today will find its way into bigger and better airlines, and in safer, cheaper and faster personal planes.

Designs, power plants, equipment, structures, materials, and even surfaces of those new planes will have been first proved in the *Constitution* and P-80's—even the one Tony bailed out of over the desert.

Right now he and the designers with whom he works, as well as their counterparts throughout the aircraft industry, are hunting for the secret door to supersonic speeds. When they find that door, styles in moving picture test pilots will have to change. The movie close-up of that day will no doubt show the hero fighting to prevent "MG" (Mars Gravity, if there is such thing—and there probably will be some day!) from pulling his plane away from earth.

When that time comes, Tony LeVier will perhaps, be "retired" to the more prosaic job of flying the camera plane that records the titanic and super-human efforts of the test-pilot hero.

Hangar Flying

(*Continued from page 16*)

CAA Notes

THE CIVIL AERONAUTICS ADMINISTRATION recently announced two publications that should be in the working libraries of all private pilots. One is "Facts of Flight," a booklet crammed with practical data and tips on such subjects as carburetor icing, safe starting of the engine, landing techniques, radio communication, acrobatics, etc. It is illustrated in color and written in a non-technical language. George Sidney Stanton, Chief of Examination Section of CAA's Office of Safety Regulation was the author. The other book is called "Terrain" and it provides a wealth of advice for pilots on how to fly over mountains, swamps, deserts, cities and shorelines. Whether you're a beginner pilot or an old-timer, this booklet is for you. Either one of these booklets may be had by sending 25 cents to Superintendent of Documents, Washington 25, D.C.

One for the Book

(HERB BRADY of the E.O. Champion Air Service, Oxford, Miss., sent this in for the Prop Wash page, but we moved it up to Hangar Flying.) Writes Herb,

"While I was instructing at an Army Primary Flight School during the war, another instructor there had a student who was a problem. The student could execute everything above average that is required before solo, but the guy couldn't fly a traffic pattern! If the instructor didn't tell him where to turn, he'd fly indefinitely in a straight direction. In a final attempt to straighten out the student, the instructor took his problem boy to an auxiliary field where there were four ponds that could be used as key points for each turn. With this help the student did fine and insisted he now knew how to fly a pattern . . . so back to the home field they went, all set for the solo. After noon mess the instructor told the student he would ride around the pattern with him once more and then he'd get out and let him solo. The confident student took off . . . but it was the same old story. He wouldn't make his turns. In utter discouragement, the instructor threw up his hands and went back to the field. Then, upon asking the student what in &%?** was the matter with him, the student calmly replied. "Well, Sir, I just couldn't find those ponds!"

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